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American CONCHOLOGIST

Quarterly Journal of the Conchologists of America,Inc.

CONCHOLOGISTS OF AMERICA, INC.

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world. In 1995, COA adopted a conservation resolution: Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.

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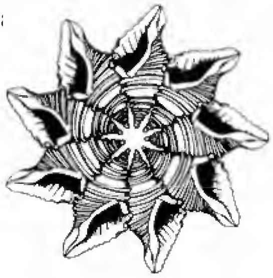
American Malacological Society Annual Meeting
June 16-21, 2012
Conchologists of America Convention
June 19-24, 2012
Information and registration at:
conchologistsofamerica.org

COA Nominating Committee Report 2012

COA 2012 Nominating Committee is composed of the following members:

Amy Dick, Alan Gettleman, and F. Matthew Blaine (Chairman)

Each of the following COA members were contacted by a member or members of the nominating committee and each has agreed to serve in the respective posts if elected. As required by the COA Bylaws we are herein publishing the list prior to the election. We are ple wing slate of officers for 2012:



José Leal, President

Harry Lee, Vice President

Phyllis Gray, Secretary

Steven Coker, Treasurer

Bill Lyons, Trustee

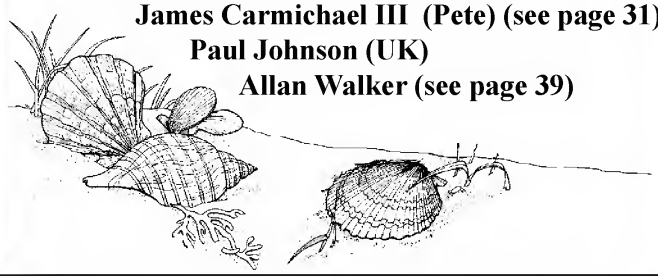
I would like to thank the members of the Nominating Committee who worked eagerly, cooperatively, quickly, and efficiently to produce this fine slate of officers. It was a pleasure to be a part of this important activity.

Respectfully submitted,

F. Matthew Blaine

In Memoriam:

Dr. Donald Bosch (see page 31)
James Carmichael III (Pete) (see page 31)
Paul Johnson (UK)
Allan Walker (see page 39)



Front Cover: *Strombus pugilis* Linnaeus,1758, from Trujillo Bay, Honduras. This common species as well as several rare species were collected during night dives from a shrimp boat. See the article by Karen VanderVen on page 20. Photograph by Marc Nathanson.

Back Cover: A colorful collection of Indonesian landsnails of the genus *Asperitas*. Species in this genus have shell colors and patterns rivaling any in the world. Photograph by Nuimal Bahar of Coventry, United Kingdom.

Claud-Mantle, Harvard, and two sinistral sacred chank shells: A THRILLING DISCOVERY

Edward Nieburger[1] and Adam J. Baldinger[2]

Thrilling can be defined as producing a sudden, strong, deep emotion or excitement, often producing trembling or quivering. Discovery is quite simply finding something. These were definitely some of the feelings I, Ed Nieburger, experienced on the night of January 3, 2012, when I was attending the meeting of the Boston Malacological Club, which has met for over a half-century on the first Tuesday of the month in the Museum Lecture Room at the Museum of Comparative Zoology (MCZ) at Harvard University in Cambridge, Massachusetts. The program for this particular night included a presentation titled, "The Mollusk Department: Past and Future" and a guided tour of the Mollusk Department by Curatorial Associate, Adam Baldinger.

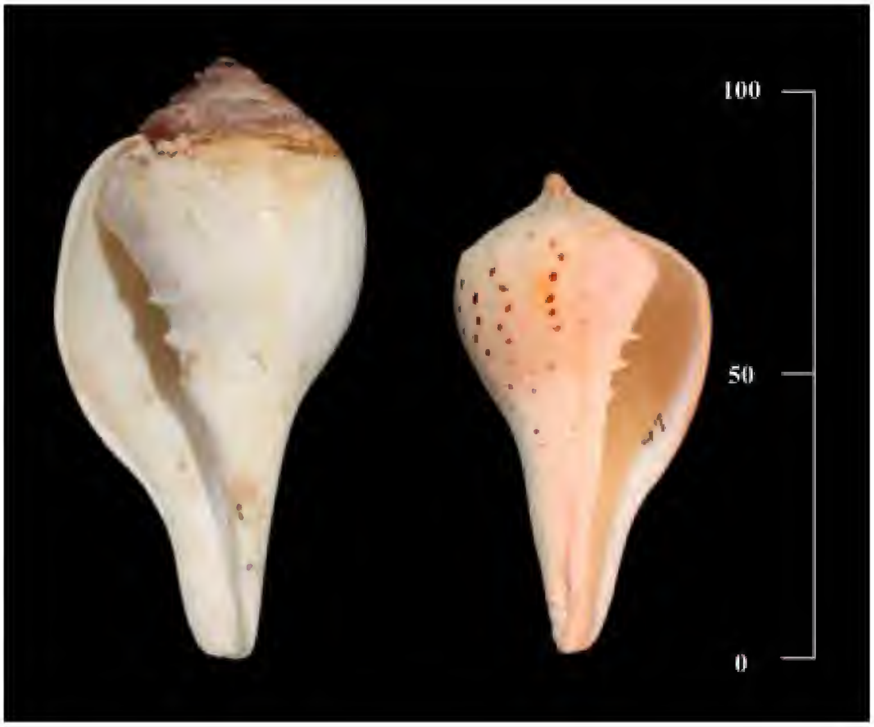


Fig. 1. A sinistral sacred chank shell, *Turbinella pyrum* (left) and the more common dextral form (right), both from the Joseph George Claud-Mantle collection donated to the Museum of Comparative Zoology, Harvard University, June 24, 2011. Scale in mm.

Following Adam's talk, club members were allowed to look through some of the thousands of drawers of shells. As the bewitching hour of ten o'clock neared, Adam said: "Time to close the cabinets and head back to the elevator." I had spent my time looking through some of the drawers containing shells from a collection I recently appraised online. I was just picking up one last shell. It was about the third or fourth shell that I touched, in a collection of thousands. I was feeling quite light-headed as I asked my friend Dan Teven, standing to my right, to verify if one particular shell opened on the left or on the right. Dan said: "left." So, we both knew the significance of the find, the ultimate rare and valuable seashell, a sinistral sacred chank shell [*Turbinella pyrum* (Linnaeus, 1758)] (Fig. 1). I never thought I would see one in person. I certainly never thought I would hold one in my hand. And to be the first in eighty years to hold such a treasure, and then to realize that it was a treasure, made me delirious.

Shock, excitement, and embarrassment overwhelmed me as the Club members headed for the elevator. Embarrassment because I had just evaluated this huge collection for the family and heirs of the collector and had completely missed seeing the left-handed specimen of what is "always" right handed. How could I have missed it? This will certainly go down as the classic "missed identification" of conchological history. My name, Edward Nieburger, will remain forever as the person who missed such an identification!

This shell was part of the Joseph George Claud-Mantle collection that was donated to the MCZ on June 24, 2011. With 5,200 shells, and with almost 4,000 species, the collection does contain rarities, including this most valuable of all shells, a sinistral sacred chank shell of India. Born in Calcutta, India, in 1858, Joseph George Claud-Mantle located to London as a young boy. His education is unknown. He went to sea as a young man and made Chief Engineer at the age of twenty-six. He arrived in America in 1882, married in 1887, and was widowed in 1907. They had three sons (one died in infancy), three daughters (one died at age eight), seven grandchildren, and fifteen great-grandchildren. Joseph George Claud-Mantle (Fig. 2) lived in New York City and assembled this large shell collection between 1880 and 1930. The shell cabinet (Fig. 3) was a remarkable built-in arrangement, with what appears to contain an equally valuable shell-book library that was located at 111 Ames Avenue in Leonia, New Jersey. Joseph George Claud-Mantle died in 1934 in Trumbull, Connecticut. He also collected rocks and minerals. Most of his shells were purchased from Hugh C. Fulton, the famous shell-dealer of London, England. Few, if any specimens, appear to be self-collected, with the possible exception of some from Long Island Sound, New York.

Claud-Mantle's grandson, George Ferrera (Fig. 4) of Trumbull, Connecticut, remembers his grandfather Joseph as a

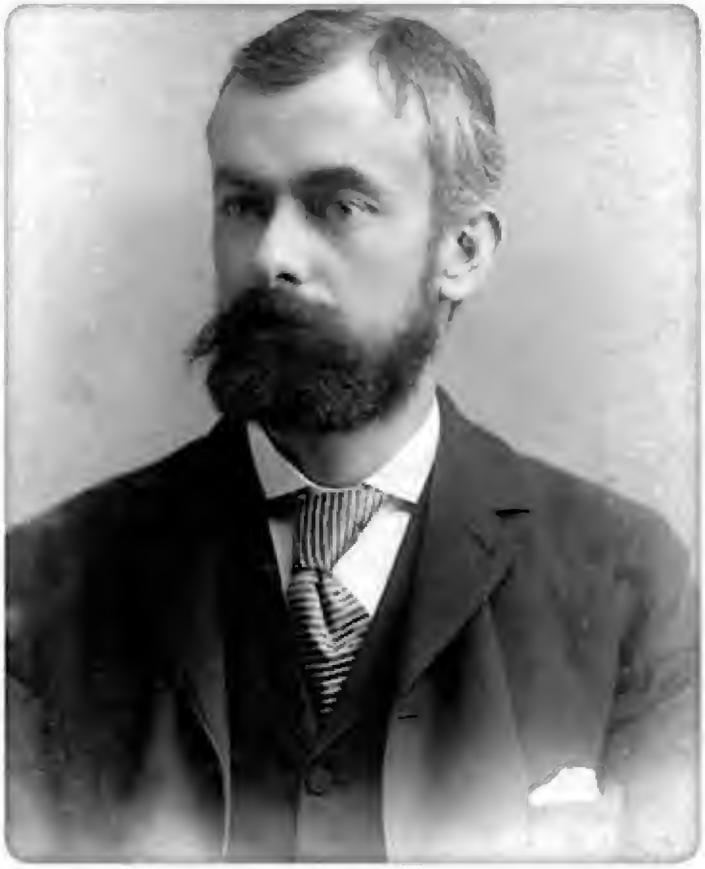


Fig. 2. Joseph George Claud-Mantle, circa 1888 (photo courtesy of Cindy Arendt).

"genteel man." Ferrera said in *The Hartford Courant* newspaper interview (Adinolfi, 2011), "An accomplished engineer, esteemed by his neighbors, he always carried an umbrella and looked dandy in a black jacket and tie. 'All my neighbors would remark about how he was a great man, a real gentleman,' He was also an enigma who, according to family legend, was the son of a British officer and an Indian woman who died of cholera while aboard a ship bound for England. He worked as an engineer, manufacturer, and inventor. He registered at least one engineering device with the United States Patent Office. He eventually founded a successful engineering firm, Mantle and Company, Park Avenue, New York City, before retiring in 1916 and moving to Leonia, a wealthy hamlet in Bergen County..." northern New Jersey. He was a member of numerous scientific organizations and museums. "After retiring, Claud-Mantle immersed himself in hobbies, particularly in his collection of shells." He enjoyed eighteen years of retirement with his growing collections.

Over the years, Ferrera offered the collection to several museums, including The Academy of Natural Sciences in Philadelphia, "but none would accept it without an accompanying donation to catalog and maintain it." In early 2008, his daughter Laura Ferrera of Norwalk, Connecticut, and her two cousins, Deborah Lasnier of Canton, Connecticut, and Cindy Arendt of Oxford, Connecticut, resolved to accomplish George's dream. They documented the collection, taking inventory using their great-grandfather's original logbooks, and then created an electronic database and online photo gallery of the shells (Figs. 5, 6, & 7).

Also from *The Hartford Courant* newspaper article (Adinolfi, 2011), Adam Baldinger said "It isn't unusual to receive collections from private collectors, but I have rarely seen a collection that was so diligently catalogued. The collection's true value is scientific, and lies in the precise way Claud-Mantle recorded data about each of his shells. The technique that he used is a technique that was commonly used by early natural-history museums. They kept a ledger and recorded the appropriate data for the specific specimens. Small strips of paper are affixed to each of Claud-Mantle's shells, listing its name and a number that corresponds with the logbook entry where he recorded information such as the shell's origin and when it was purchased. I'm very interested in this collection because of the data and the careful work of the family, and particularly the great-grandfather, that was put into the collection. Claud-Mantle probably corresponded with professional scientists and collectors from around the world, who taught him how to preserve and record his shells. It will take several months to catalogue and study the collection. Until then, we cannot determine which shells have the most scientific value." In the meantime, family members can view their ancestor's full collection, online in images posted on their private website.

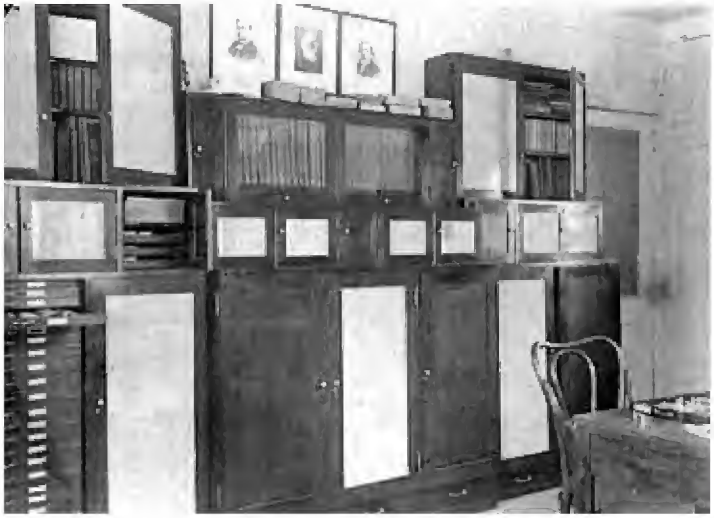
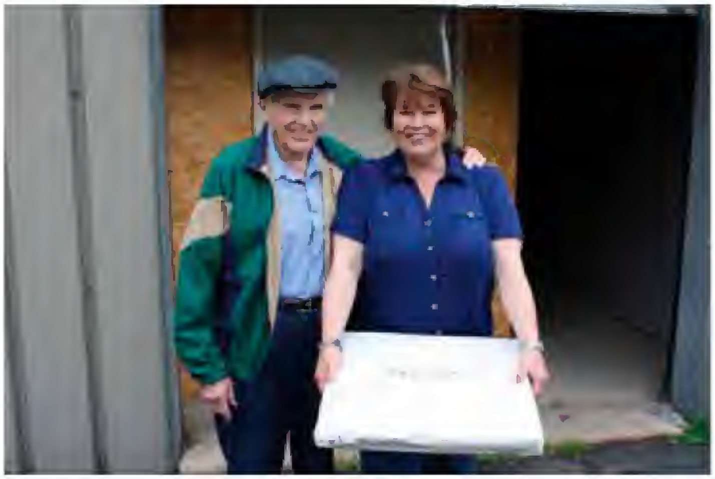


Fig. 3. (Above) Joseph George Claud-Mantle shell cabinet and library (photo courtesy of Cindy Arendt).

Fig. 4. (Below) George Ferrera and Deborah Lasnier holding a drawer of Claud-Mantle specimens on June 24, 2011 – transfer day of the collection to the Museum of Comparative Zoology.



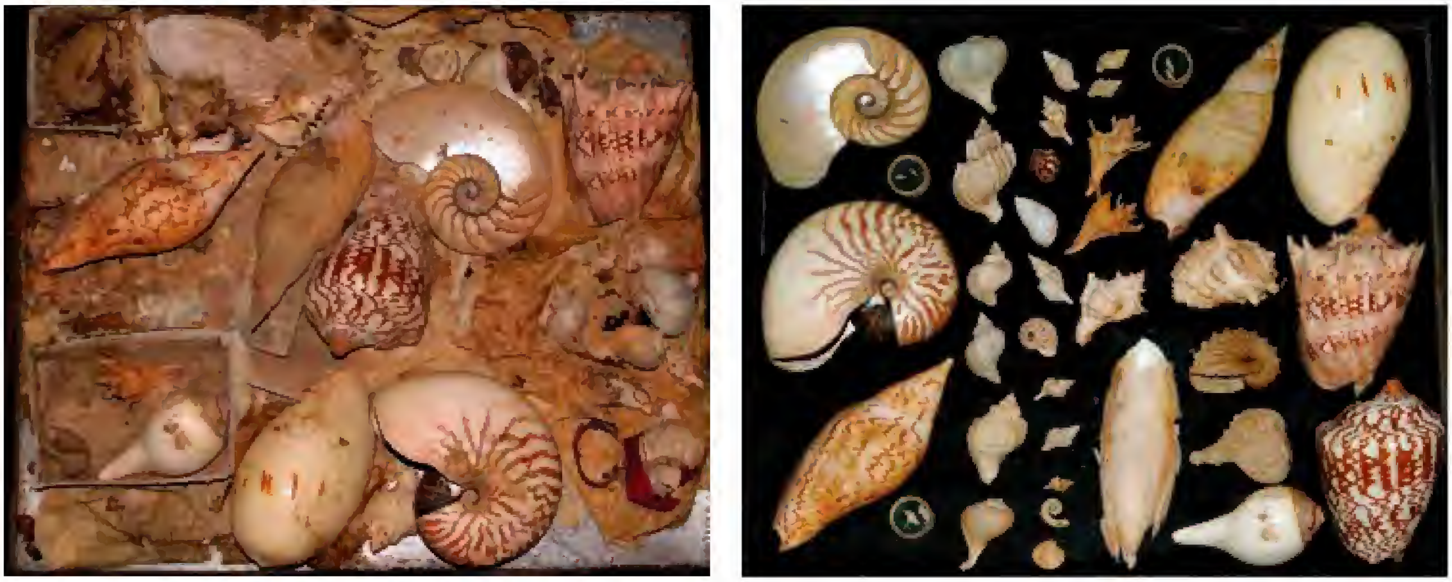


Fig. 5. (left) Fig. 6. (right) The drawer (left) in its original condition as Ed first saw it with the sacred chank shell, aperture down, and (right) after the cousins cleaned the drawer and shells (photos courtesy of Cindy Arendt).

Joseph George Claud-Mantle was connected to the American Museum of Natural History in New York City while he lived there. After he died in 1934, the 120 cabinet drawers of shells were carefully removed by family members and stored, without the cabinets, then moved about the Northeast five more times, in New Jersey, to Vermont, then Connecticut. Then in early 2008, Deborah, Cindy, and Laura took on the project of cleaning and photographing the collection (Figs. 5, 6, & 7). This project took almost four years. Eighty years had taken only a small toll on the arrangement of shells, and the shells cleaned up well for the transfer to the MCZ (Figs. 4 & 8). My appraisal was based on viewing the photographed shells online. These cousins spent infinite hours photographing the drawers and most of the shells, individually, but not the chank shell. Their extensive and exhaustive time involved has to be considered a labor of love.

For eighty years this sacred chank shell avoided re-discovery, sitting in a drawer with many much more attractive shell specimens. The cousins were right when they speculated that there was a really rare "sleeper" shell in the collection, and it would be a "plain Jane." The shells were now sitting in MCZ drawers (Fig. 9) during that first week of January 2012, eighty-five years after Joseph George Claud-Mantle had bought the sacred chank from Hugh C. Fulton, in 1927, for five pounds sterling, just waiting to be re-discovered.

It took just overnight for Adam and me to start checking. Adam double-checked that the specimen was indeed part of the Claud-Mantle collection, and it did appear in one of the thousands of photographs of the collection that I had used during the online valuation of the collection for the family. It was "hiding," aperture down in a drawer (Figs. 5 & 6) with other stellar shells, including two *Austrotrophon catalinensis* (Oldroyd, 1927), shells that had distracted me from recognizing this "ultimate" valuable shell.

A similar sinistral sacred chank shell is wonderfully documented in *American Conchologist* (June, 2011), in Harry Lee's detailed article about his own specimen, which is destined for the Florida Museum of Natural History at the University of Florida, Gainesville. Dr. Lee estimated that there are several hundred such specimens in Asia today. The sinistral, or left-handed, chank is revered as a religious object in Hindu temples, as the place where Vishnu, the god of the sea, had hidden sacred scrolls (Rose, 1974, 2011). Dr. Lee estimated that there are probably just three specimens of the sinistral sacred chank shell in North America.

Rice (2011) then wrote an article that appeared in the same June 2011 issue of *American Conchologist* answering the question: "What shell is the most valuable?" Coincidentally, his conclusion was that the sacred chank shell was the most valuable, not just for its rarity in nature, but also because of its value as a religious object. The sacred chank shell comes from shallow water, off India. The shell coils dextrally, or is "right-handed," almost always. A great rarity is one that coils sinistrally, or is "left-handed," opening on the left with the spire pointed up. Only one in six hundred-thousand coils sinistrally (Lee, 2011)! It was in Rice's (2011) article that the sinistral specimen was valued at $45,000. The normally right-handed specimens sell for under $10.

The five pounds sterling that Claud-Mantle paid for his sinistral specimen was a lot of money in the 1920s, but what Joseph George Claud-Mantle paid for the chank can be compared to what he paid for a glory of the seas cone, *Conus gloriamaris* Chemnitz, 1777, also in that same time period: eighty pounds sterling, also bought from Hugh C. Fulton, of London.

The family and heirs of Joseph George Claud-Mantle are very excited with this newest discovery. They are thrilled that their great-grandfather's shells are safe and being appreciated by others. As fate would have it, this newly re-discovered specimen stimulated Adam to review the literature and the department's database and he notified me of yet another sacred chank shell in the collections (Fig. 10). This one came from the Duchess of Portland collection from the 1700s. This older specimen is a bit smaller than the Claud-Mantle specimen, but how remarkable is it to have two such specimens in the same place? Harry Lee was very insightful in stating that there are "three specimens in North America" (Lee, 2011). It appears that there are no others known either in private collections or in museums in North America.

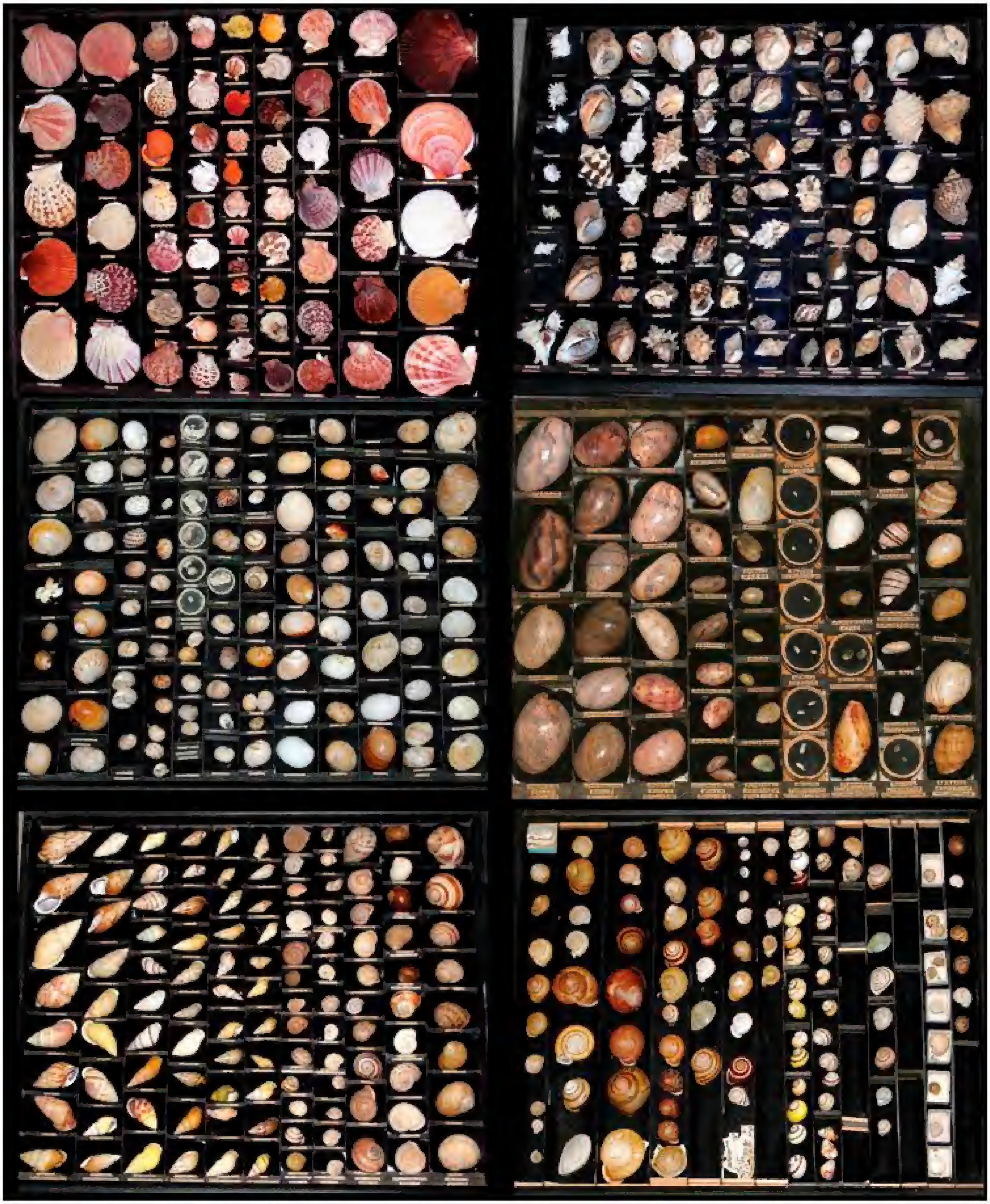


Fig. 7. Some of the original drawers containing Claud-Mantle specimens that total over 5,200 shells and almost 4,000 species (photos courtesy of Cindy Arendt).

Fig. 8. Specimen drawers neatly wrapped and stored in preparation for transferring the Claud-Mantle collection to the Museum of Comparative Zoology.

The Duchess of Portland collection provided the first sinistral sacred chank shell specimen that came to the MCZ (Johnson, 1999). The Duchess Dowager of Portland, Margaret Cavendish Bentinck (1714 - 1785), was a member of the British elite. She made friends with "Dr. David Solander and Sir Joseph Banks, who would soon accompany Captain James Cook on his first voyage of discovery to the South Seas (1768 - 1771)" (Johnson, 1999). Many rare shells found their way from that voyage into the Duchess's cabinet. "A year after the Duchess's death, in 1786, a sale catalog of her shells was made up by her chaplain and librarian, Rev. John Lightfoot. Lightfoot, a botanist and conchologist himself, printed over twelve hundred copies of *The Portland Catalogue*, which would eventually be recognized as a legitimate descriptor of new species, with Lightfoot as their author. *The Portland Catalogue* claimed that the Duchess of Portland collection was the finest in Europe." (Johnson, 1999) It probably was. The sale took thirty-eight days to complete. On its final day, Lot 4023, the Duchess's sacred chank shell "a very fine reversed *Voluta ponderosa*, S. (Solander ms – as in label only) or Heavy Volute, *extremely scarce*, from the East-Indies. A direct (dextral) one is figured in Favanne, pl. 35, fig. 1" (Johnson, 1999) was sold. Lot 4023 eventually came to Boston, but not before being in multiple important European collections between 1786 and 1938. It is most interesting that this "Portland chank" came from England to America through the hands of the same London shell dealer, Hugh C. Fulton, who had handled the Claud-Mantle chank shell. They came eleven years apart. The Duchess's shell came in about, or soon after, 1938. "The Duchess's Portland chank arrived to the collection of Gretchen Osgood Warren, a wealthy Brahmin, at 8 Mount Vernon Place, Beacon Hill, Boston," (Johnson, 1999) a very aristocratic address. From her daughter, Rachel, the shell was given to the Boston Museum of Science, and then in 1962 most of the museum's collection was transferred to the MCZ (Johnson, 2004). The Duchess's shell came to America at almost the same time that Harry Lee's specimen arrived.

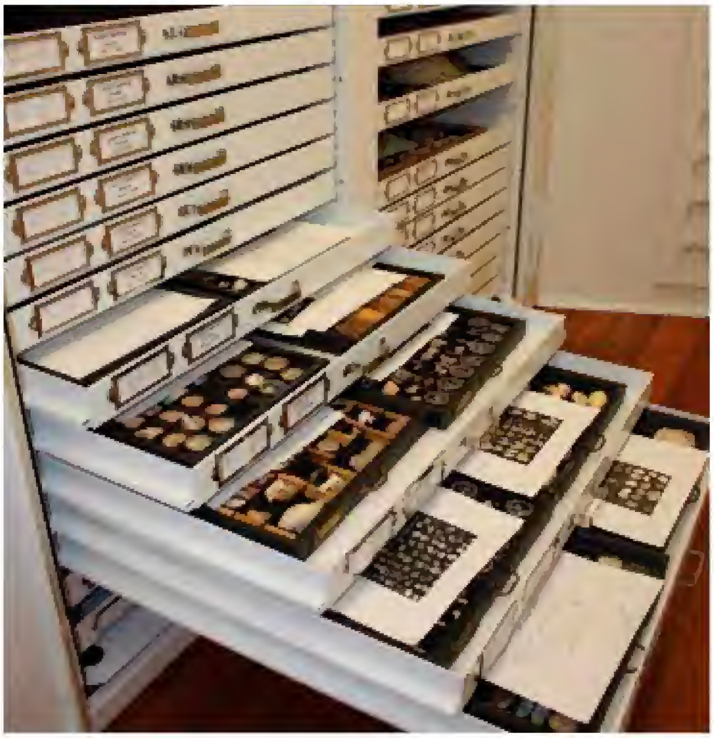


Fig. 9. The Claud-Mantle collection safely housed within specimen cabinetry within the Department of Malacology at the Museum of Comparative Zoology.

Presently the Claud-Mantle sacred chank shell has less provenance. Claud-Mantle was living in Leonia, New Jersey, in 1927 and must have been putting the finishing touches on his collection. The three cousins still have a file of correspondences between Joseph George Claud-Mantle and Hugh C. Fulton. Perhaps the details and history of the sacred chank shell in Claud-Mantle's collection will emerge, maybe even its locality data and earlier chain of ownership. Could it be that this sacred chank came from a famous European collection?

The Claud-Mantle collection (Fig. 11) also contained two golden cowries, *Lyncina aurantium* (Gmelin, 1791); one *Barycypraea fultoni* (Sowerby III, 1903), for which he paid twenty pounds sterling; *Bernaya teulerei* (Cazenavette, 1846) from Aden, Arabian Sea, for which he paid eighty pounds; two *Erronea nymphae* (Jay, 1850) from Mauritius; a rhododendron cone, *Conus adamsonii* Broderip, 1836; a *Conus timorensis* Hwass in Bruguiere, 1792; a noble cone, *Conus nobilis nobilis* Linnaeus, 1758; a *Cymbiola (Cymbiolacca) thatcheri* (McCoy, 1868); two *Austrotrophon catalinensis* (Oldroyd, 1927) from California; a *Lyria* (*Harpeola*) *anna* (Lesson, 1835) from Mauritius; a *Carinaria cristata* (Linnaeus, 1767) from the Moluccas, a tiny shell that looks like a glass ice-cream cone; a violet spider conch, *Lambis violacea* (Swainson, 1821); *Cymbiola (Cymbiola) cymbiola* (Gmelin, 1791); a ribbed harp, *Harpa costata* (Linnaeus, 1758); and freshwater snails such as *Io fluvialis* (Say, 1825) from Tennessee and an elaborately ornamented snail *Tiphobia horei* E.A. Smith, 1880, from Lake Tanganyika. Claud-Mantle even had a drawer of pteropods, pelagic or free-swimming mollusks from mid-ocean.

The Joseph George Claud-Mantle collection is a wonderful historical record of what an outstanding collection of its time looked like. The species selection is remarkable, even though (and perhaps because) there are almost no self-collected shells! Each genus has complete runs of the available species of the time. It must have been one of just a handful of such collections

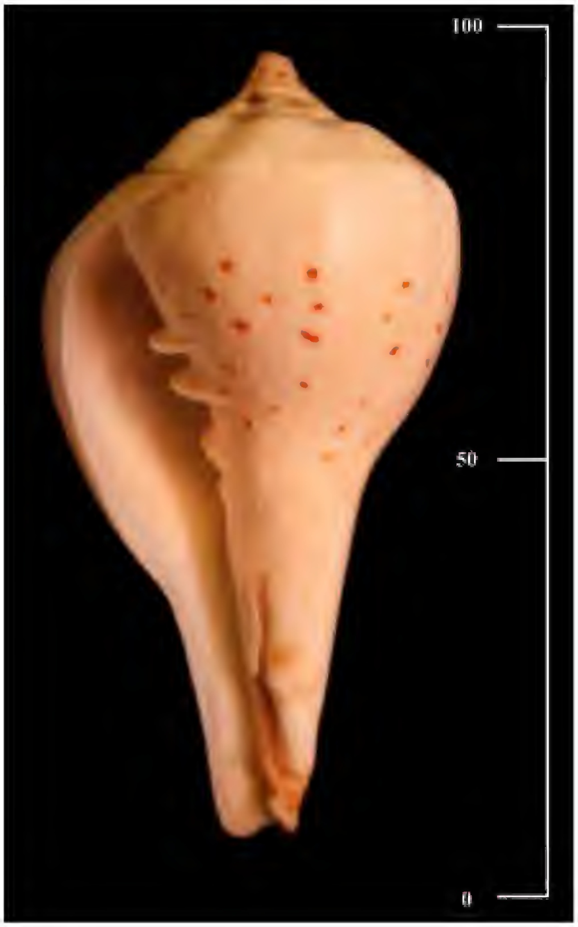


Fig. 10. Another sinistral sacred chank shell, *Turbinella pyrum* (MCZ 249020) within the Department of Malacology at the Museum of Comparative Zoology. It was once part of the Duchess of Portland collection. Scale in mm.

world-wide a century ago. Since Hugh C. Fulton was the premier dealer of the day, and we believe that Claud-Mantle was probably his prime customer at the time, this collection is likely the star collection of its era. It is remarkable that his heirs preserved this collection. I am certain that Joseph George Claud-Mantle would be very proud to have his collection appreciated by descendants he never got to know. I am grateful that I had the opportunity to experience such a thrilling discovery.

Acknowledgments

The authors thank Cindy Arendt, Laura Ferrera, Deborah Lasnier, and "Uncle" George Ferrera for the opportunity to share their story of, and to carefully study the collection of, Joseph George Claud-Mantle. We thank Cindy Arendt for the use of many of her images. We also thank Gayle Nieburger for proofreading and adding valuable comments to this manuscript and Harry G. Lee for his thorough review and editorial comments.

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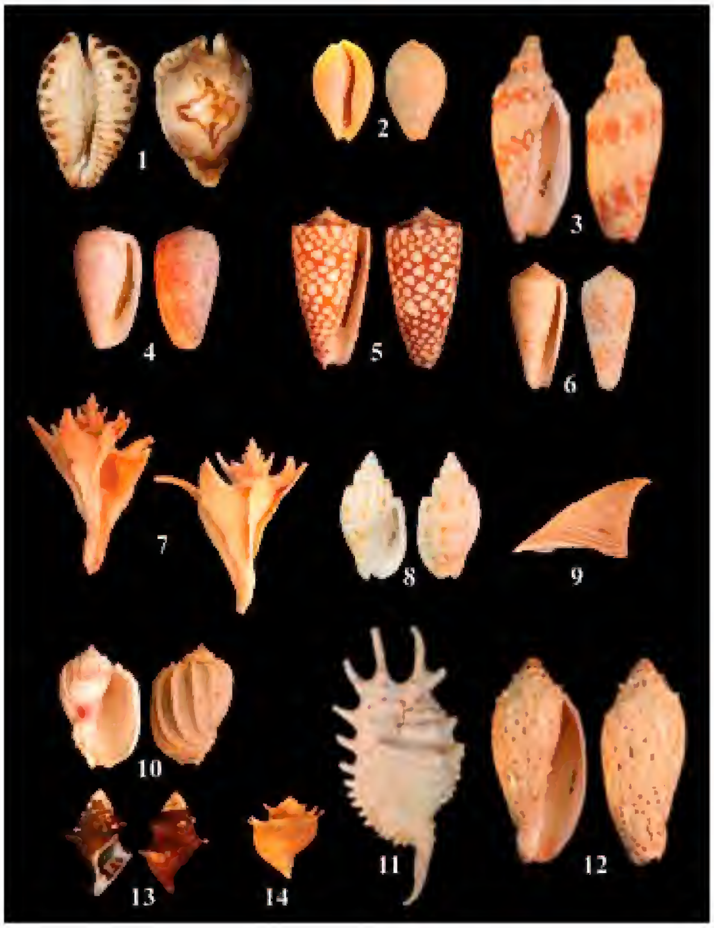

Fig. 11. Selected specimens within the Joseph George Claud-Mantle collection: 1. *Barycypraea fultoni*, 2. *Erronea nymphae*, 3. *Cymbiola* (*Cymbiolacca*) *thatcheri*, 4. *Conus adamsonii*, 5. *Conus nobilis nobilis*, 6. *Conus timorensis*, 7. *Austrotrophon catalinensis*, 8. *Lyria anna*, 9. *Carinaria cristata*, 10. *Harpa costata*, 11. *Lambis violacea*, 12. *Cymbiola* (*Cymbiola*) *cymbiola*, 13. *Io fluvialis and* 14. *Tiphobia horei*.

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The Sacred Chank Shell and other shells within the Claud-Mantle collection are now on public display within the Harvard Museum of Natural History as part of an exhibition titled "Mollusks: Shelled Masters of the Marine Realm." This exhibition will be in place through February 2014.

Partulid snails, their collectors, and a prodigious dynasty of French naturalists

Harry G. Lee

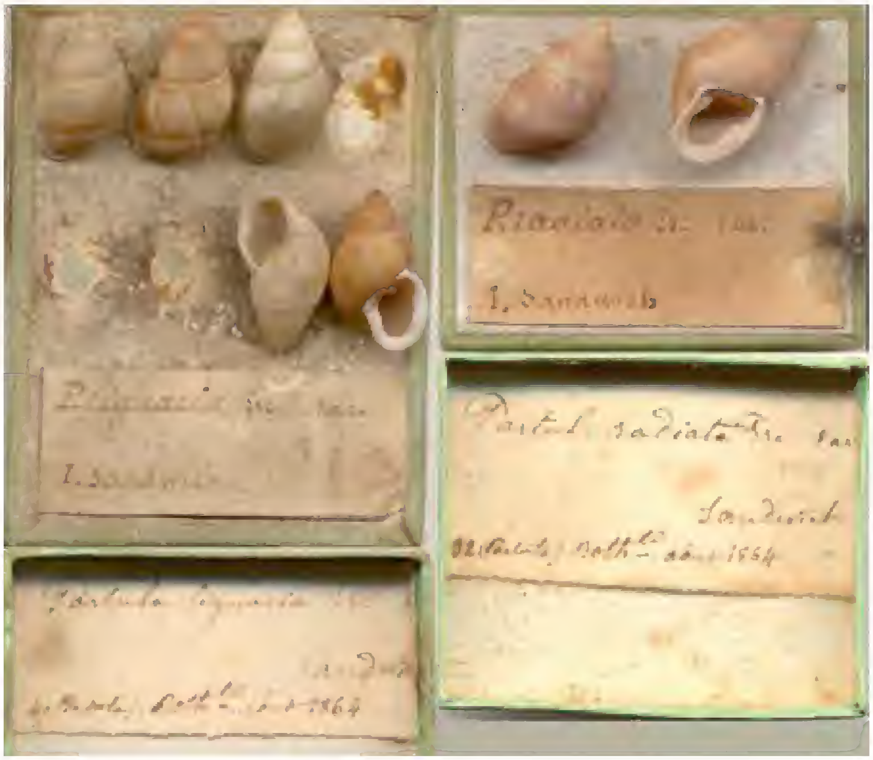


Fig. 1 The original display with the shells glued to the top of the box and the labels attached inside. The label under the shell provides the name and locality while the additional label(s) inside the box expand the information.

The Acquisition Phase; the "Adanson Family Collection"

The peripatetic Alain Allary, noted French shell-dealer and frequent participant in COA Convention bourses, and I go back quite some time. I recall getting some very interesting, both biologically and historically, shells from him as far back as the Panama City (1993) event, but our conversations and transactions have unfortunately been relatively few and far-between. Consequently I was pleasantly surprised at the recent Port Canaveral bourse when he showed me a sizable sample of curatorially time-worn tropical land snails. Alain informed me that they were from a collection belonging to the extended family of pioneer malacologist Michel Adanson. He went on to say the shells began to accumulate in the Eighteenth Century and increased in number through the efforts of certain members of later generations. Fascinated as much by the fame and antiquity of the material as my need to know more about *Partula* snails, obviously the dominant group in the assortment, I happily purchased the entirety of his offering.

The state of conservation of this little collection certainly warrants more than passing comment. Firstly, Alain found this material in a somewhat less well-curated condition than I did. He had labored to place what seemed to be all the constituents of each lot in a Ziploc®-style plastic bag. I found one to eight specimens constituting each lot. The shells were, or had been, glued to the outside of the bottom of mostly uniform cardboard trays (75X60X10 mm); a neatly handwritten, uniformly-formatted, label with the scientific name, author, and a brief indication of the locality was glued next to them. On the inside of the tray were glued one to three labels with less disciplined handwriting - often clearly that of more than a singular scribe, and usually containing more information as to provenance [**Fig. 1**]. The vagaries of time and neglect were quite apparent, and no shell or label escaped them. Dust, detachment of shells and labels from the glue, insect and rodent depredations on the labels, foxing of all the trays and labels, and (rarely) a missing label or shell had to be dealt with. Then there came the task of freeing the majority of labels and specimens from their holdfasts. Actually the process of rehabilitation went well, but it was quite tedious and time-consuming, lasting several days. An added dimension of complexity in the (re)curation effort was the inaccuracy of some labels (over 20% misidentifications, sometimes wanton, as well as incorrect locality, e.g., the extensive use of the designation "Îles Sandwich," then exclusively applied to the Hawaiian Islands, an ipso facto inaccuracy. All this notwithstanding, the results were gratifying. The shells for the most part had escaped permanent damage from Byne's Disease and other threats, loose specimens and labels matched up eventually, and ultimately the labels were almost all decipherable [**Figs. 2, 3**]. I had before me a total of 183 specimens in 58 lots, all seeming of a single vintage, the mid-Nineteenth Century. Of the total, 175 specimens in 54 lots are partulids. Of these partulids, 166 specimens in 52 lots were collected in French Polynesia and are comprised of 31 species [**Plate 2**]. Most of the remaining 21 lots are taxa subordinate to the 31 species, and a few are duplicate lots. The other partulid material, two lots, two species, originated in Micronesia (Guam and Ponape). The remainder, eight non-partulid specimens comprising four lots, are phylogenetically and zoogeographically diverse land snails (*Macroceramus, Cerastoides, Orobaphana, Tropidophora*). This acquisition and the process of its (re)curation taught me more than I ever expected to learn about *Partula* and Partulidae.

Taxonomy and other aspects of the natural history of the Partulidae

The family Partulidae Pilsbry, 1900, is deployed throughout the high islands of south and western Oceania as well as New Guinea. Its metropolis is in French Polynesia, particularly the Society Islands. Here the nominotypical subgenus of *Partula* Férussac, 1819, is limited to the Society and Hervey Is. (Pilsbry, 1909). It has more than 76 species, with several subspecies in addition (Brewer, Czekanski-Moir, and Rundell, 2007). Most *P.*

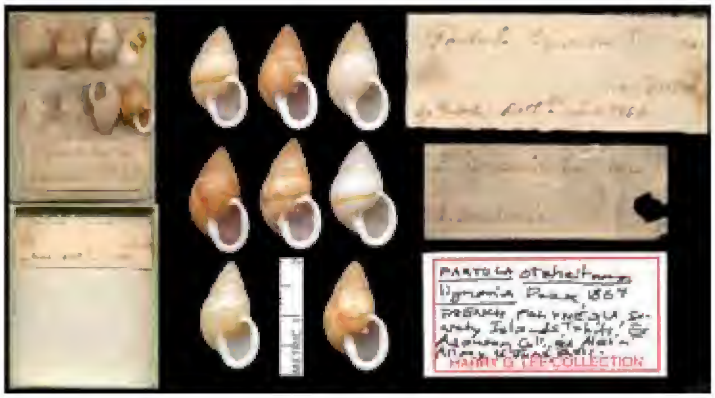
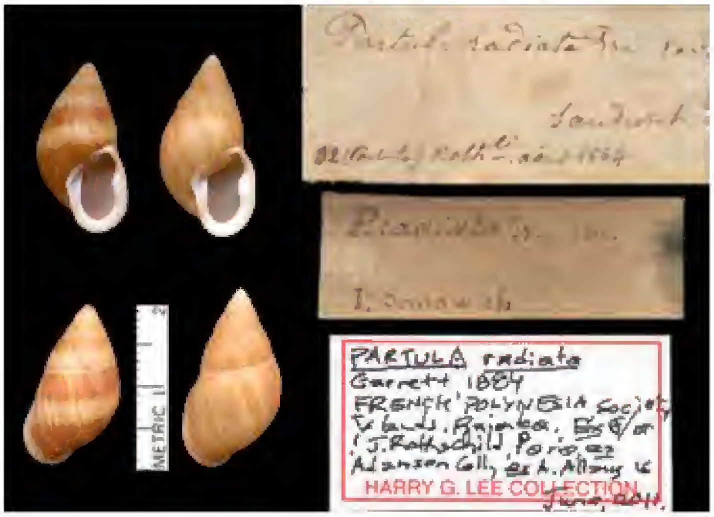


Fig. 2 (above) and Fig. 3 (below) show details of the original display and labels as well as the authors new labels. The shells are obviously in excellent condition.



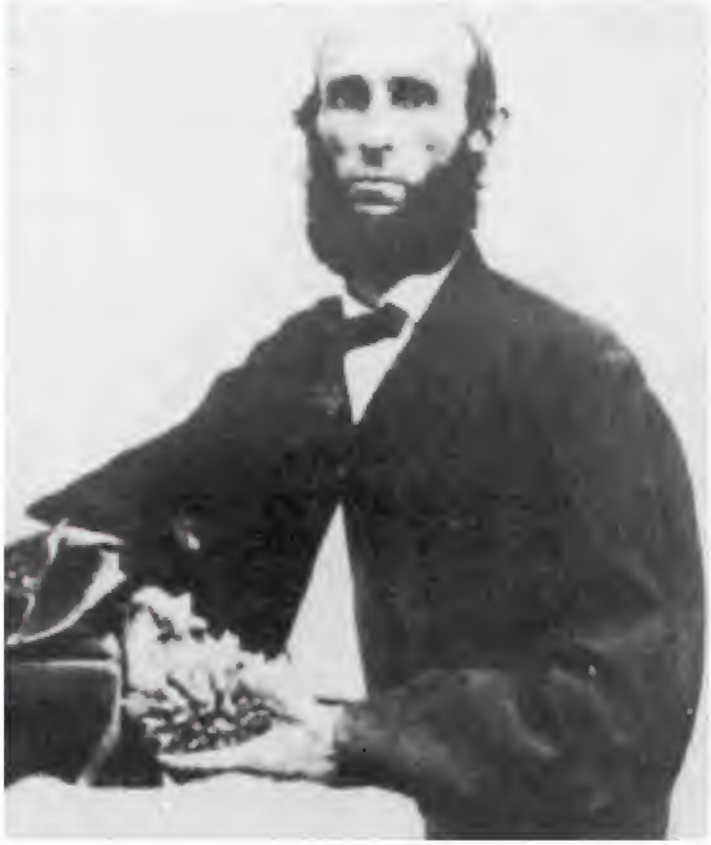


Fig. 4 William Harper Pease (1824-1871) who, along with Andrew Garrett (1823-1887), spent numerous years exploring and collectiong in the tropical Pacific. In all, Pease named 31 partulids while Garret named 11.

(*Partula*) species are limited to a single island even though several inter-island distances are rather small (Pilsbry, 1909). Although predominantly arboreal, there are several terrestrial species (Pilsbry, 1909). Among the four genera (eleven subgenera) in the family (Schileyko, 1999), many taxa in this subgenus distinguish themselves with a variety of color patterns, more conspicuous in the tree-dwelling species. Most islands have more than a single species and ecological as well as geographical forces seem to have driven their evolution. The steep terrain isolates many deep valleys, in which the snails prosper. Besides allowing divergence of species, such topographic barriers have allowed infraspecific variation (forms and subspecies) to evolve within taxa distributed over relatively wide areas with varying landscape. Examples of this include *P. (P.) otaheitana* (Bruguière, 1792) [**Plate 2, figs. 22-27**] on Tahiti and *P. (P.) rosea* [**Plate 2, figs. 31-32**] on Huahine.

The type, and first-named, species of *Partula* is *[Limax] faba* Martyn, 1784 (2: pl. 67), described from shells brought home to England under the command of Captain James Cook (1728-1779), who visited Raiatea, Society Is., aboard HMS *Endeavour* in July 1769 on the first of his three voyages. Because the *Universal Conchologist* of Thomas Martyn (1735-1825) (see Dall, 1906, 1908) was not a consistently binominal work, the International Commission for Zoological Nomenclature exercised its plenary powers (ICZN, 1957) to declare most of its names unavailable for the purposes of taxonomic nomenclature.* Fortunately Gmelin (1791: 3623) had already validated the name, as *Helix faba* [**Plate 1; Plate 2, fig. 10**], which, albeit mislocalized in Tahiti, nonetheless limited nomenclatorial confusion. By the next year, Cook material somehow reached the French malacologist Jean Guillaume Bruguière (1749-1798), who named *Bulinus otaheitanus*, which he believed to be an inhabitant of fresh waters.

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* Nine well-known New Zealand marine gastropod species, also the product of Cook's explorations, were spared suppression by the ICZN: (1) *[Patella] denticulata*, now *Cellana denticulata* (Martyn, 1784) [Patellidae]; (2) *[Trochus] granosus*, now *Turbo (Modelia) granosus* (Martyn, 1784) [Turbinidae]; (3) *Trochus heliotropium*, now *Astraea heliotropium* (Martyn, 1784) (Turbinidae]; (3) *Buccin[um] linea*, now *Buccinulum linea linea* (Martyn, 1784) [Buccinidae]; (5) *Buccin[um] maculosum*, now *Cominella maculosa* (Martyn, 1784) [Buccinidae]; (6) *[Limax] opalus*, now *Cantharidus opalus opalus* (Martyn, 1784) [Trochidae]; (7) *Buccin[um] papulosum*, now *Struthiolaria (Struthiolaria) papulosa* (Martyn, 1784) [Struthiolariidae]; (8) *[Trochus] punctulatus*, now *Maurea punctulata* (Martyn, 1784) [Calliostomatidae]; and (9) *Buccin[um] vermis*; now *Struthiolaria (Pelicaria) vermis* (Martyn, 1784) [Struthiolariidae].

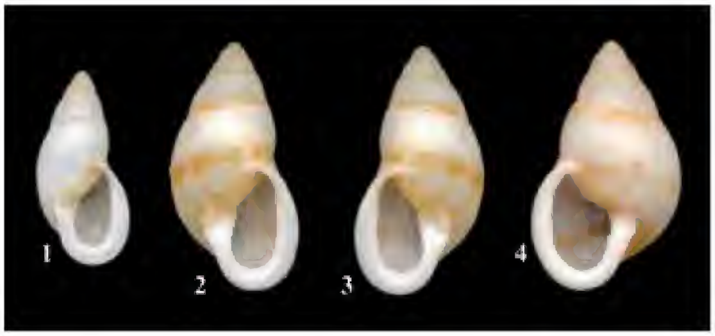

Fig. 5 (left to right) compares (1) *Samoana attenuata*; (2) a mirror-image of the no. 3 shell, a possible hybrid; (3) the shell found with a group of *Partula otaheitana* that is obviously not that species; and a typical *P. otaheitana* lot-mate of the no. 3 shell. I'll let the reader decide if this constitutes a reasonable case for hybridization.

The next century saw more intensive exploration of Oceania by the leading seafaring nations. Dr. René Primevère Lesson (1794-1849), having served as naturalist aboard the French Corvette *La Coquille*,** returned in March 1825 from its three-year-long circumnavigation. He accumulated a rich booty of novel natural history objects including Birds-of-Paradise and an ample helping of *Partula* species collected in Tahiti, Bora Bora, the Carolines, and New Guinea. He described a handful of the latter years later (Lesson, 1831). *Partula* were also among the myriad treasures brought home by pioneering conchologist Hugh Cuming (1791-1865). Known to many as "The Prince of Shell Collectors" (Dance, 1986), he, in the tradition of countryman Cook, visited French Polynesia in 1827-1828 on the first of his three voyages of exploration in the Pacific. Cuming's *Partula* species were named by Englishmen William John Broderip and Lovell Reeve as well as Ludwig (Louis) Pfeiffer in Germany. **Plate 1** features figures of *Partula* appearing in three of the six aforementioned authors' works.

Fig. 6 Michel Adanson (1727-1806) produced the *Histoire naturelle du Sénégal* in 1757 (see Fig 7). Published a year before the Tenth Edition of the *Systema Naturae* (Linnaeus, 1758), it is not considered available for nomenclatorial purposes (excluded by Article 3.1 of the *Code* (ICZN, 1999), but is still of import for its contribution to malacology. Adanson is the beginning of the paper trail of these shells.

Three decades would pass before the Society Islands became the scene of the great epiphany in *Partula* discovery and understanding. This enlightenment wasn't wrought by the French or English but through the labors of Andrew Garrett (1823-1887) and William Harper Pease (1824-1871) [**Fig. 4**; note the "cadaverous" countenance (Thomas, 1954)], expatriate Americans who spent most of their lives on tropical Pacific Islands. These halcyon years of discovery, and dissemination of knowledge of *Partula*, seem to have been coeval with the collection Alain provided. Pease and Garrett were friends and worked closely together from 1857 until 1863, when Garrett left Hawaii for the final time. From then until Pease's death in 1871, they maintained an extensive correspondence. Although of two different dispositions and backgrounds, their collaboration was quite fruitful. Garrett was the intrepid traveler, collector, and (well) self-taught field naturalist; Pease, although not neglectful of fieldwork, was more the armchair collector, articulate writer, tutor, and sometimes sponsor (Thomas, 1979; Kay, 1975; Johnson, 2002). Garrett visited the Society Islands briefly in 1856-1857, and he returned there in 1860 for a more extensive stay. Commenting on the work of his scientific predecessors (notably Cook and crew, Lesson, and Cuming), he wrote: "During the years 1860-1863 I made a much more thorough exploration than any of my predecessors, and, by searching in nearly every valley of the group, discovered 50 new species..." (Thomas, 1979). In 1863 Garrett returned to Hawaii and shortly quit those islands for the Central Pacific, where he spent the next seven years traveling to the islands of Tuamotus, Marquesas, Samoa, and Fiji groups. All the while he sent shells to Pease, who named them promptly. Although usually published, many such nomina, noticeably among the *Partula*, existed in manuscript only (Clench, 1975; Crosse and Fischer, 1873). Shells bearing such names, e.g., *Partula radiata* "Pse." [**Fig. 3**], were

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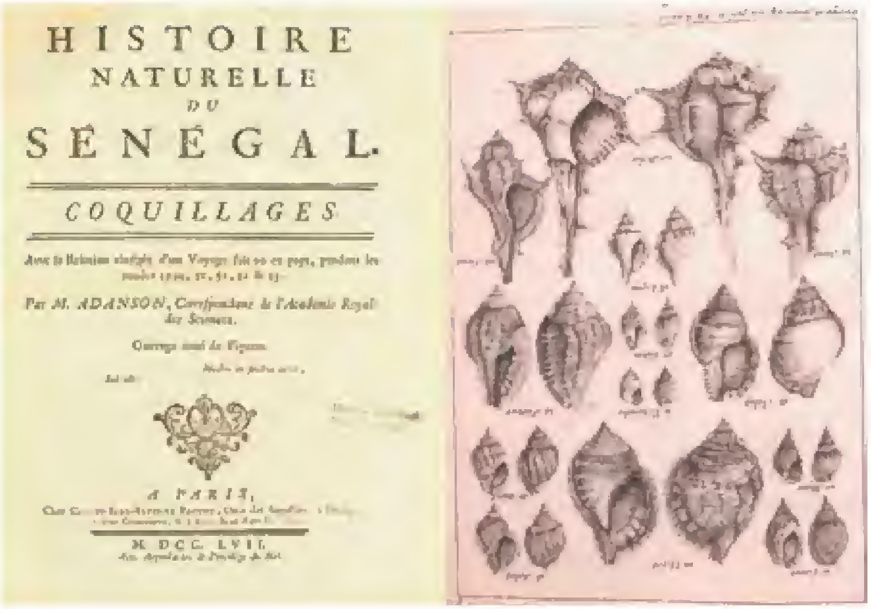
** Within a year of her return to France, *La Coquille* was refit, re-christened *l'Astrolabe*, and launched on another three-year circumnavigation of geographic and scientific exploration (1826-1829). Jean René Constant Quoy (1790 - 1869) and Joseph Paul Gaimard (1796–1858) succeeded Dr. Lesson in the role of expedition naturalists. Their report on the Mollusca (Quoy and Gaimard, 1832-1835) contained a great many new species, including two Melanesian partulids, and some of the finest illustrations ever drawn (Dance, 1986).



HISTOIRE
NATURELLE
DU
SÉNÉGAL.

COQUILLAGES

Par M. ADANSON,

A PARIS,

M. DCC. LVII.

Fig. 7 Michel Adanson's *Histoire naturelle du Sénégal* (1757) was richly illustrated and dealt exclusively with the mollusks of Senegal.

widely but illicitly in use on labels in contemporary collections such as the one on which this report is based. During his final 17 years, which he spent on Huahine, and only after Pease's demise, did Garrett produce significant scientific papers. Although mostly short communications describing new marine shells, one was a sentinel work indeed, the pages of which often contain extensive descriptions of the ecology, habits, and zoogeography of virtually all the *Partula* known from the Society Islands (Garrett, 1884). Alongside the over 10,000 specimens, not among the great many lost in two devastating shipwrecks, successfully reaching his many correspondents, e.g., Pease and Newcomb in HI, Hartman in NH (Smith, 1901), Anthony in Cincinnati, L. Agassiz at Harvard, and Godeffroy in Hamburg, and his extensive collection of 8,000 species and 30,000 specimens (Spoehr, 1963), now at the Bishop Museum, Honolulu (Clench, 1979; Johnson, 1994), this contribution stands as his most treasured legacy to malacology, evolutionary genetics, and terrestrial ecology. Fortunately for taxonomists, he also synonymized or validated [as demonstrated in **Fig. 3**] all of his mentor's extensively-circulated manuscript *Partula* nomina. In all, Pease named 31 valid partulid species-level taxa, the lion's share from the Society Islands, and virtually all supplied by Garrett, who added eleven of his own, nine of which were based on Pease manuscript names. That his contributions were not limited to malacology is perhaps most notably exemplified by a work based on some 470 of his high quality paintings of the fishes of Oceania (Günther, 1873, 1873-5, 1909 *fide* Spoehr, 1963: 101).

Variability and genetics in *Partula*

Reference to **Plate 2: figs. 31, 32** and to **Figs. 2 and 3** will give the reader a hint of the variation in color and pattern expressed in about half the species of *Partula (Partula)*. These characters vary within as well as between colonies. Other plastic characters include shell-size and direction of coil (mutation to sinistrality). I make no secret of being fascinated by the latter phenomenon and admit the passion fed my impulse to get involved with the "Adanson Family Collection" in the first place. All told, there are about a half dozen exclusively sinistral and about that number of enantiomorphic (relatively frequent occurrences of both left- and right-coiling shells) species in *Partula* (Crampton, 1916, 1932). In the Partulidae, reversal of coil is seen in only two other instances: within certain colonies of *Marianella gibba* (Férussac, 1821) in the Marianas (dextral specimens were in the purchased assortment), and characteristically in the small, obscure genus *Draparnaudia* Montrouzier, 1859, centered in New Caledonia. With easy access to large numbers of the protean snails, it's not surprising that geneticists enthusiastically (and successfully) adapted *Partula* snails to their labs.

Indeed, in the tradition of Gregor Mendel's iconic pea plant, a century of research on the inheritance of these traits has earned *Partula* poster-child status of "model organism." All the aforementioned characters are for the most part genetically determined and generations of laboratory and field workers (not to mention dozens of generations of snails) have devoted valuable time and energy to the elucidation of these processes (e.g., Crampton, 1916, 1924, 1932; Murray and Clarke, 1968, 1976a, 1976b).

Hybridization in *Partula*

With relatively penetrable ecological and geographic boundaries between species of *Partula* cohabiting an island in the Society group, it comes as no surprise that inter-species hybrids occasionally crop up under certain conditions. Garrett (1884) recorded such cross-breeding not uncommonly between *Partula elongata* and *P. taeniata, P. garretti* and *P. thalia, P. faba* and *P. virginea, P. faba* and *P. radiata* (arboreal and terrestrial respectively), *P. faba* and *P. fusca, P. fusca* and *P. navigatoria*, as well as the latter and *P. faba* [the parent species are figured on **Plate 2**]. All these hybrids were observed on Moorea or Raiatea; Garrett made a point of reporting that none was seen on Tahiti or Huahine.

Among the shells obtained, one specimen in a suite of seven sinistral *Partula otaheitana*, a Tahiti endemic, has a very different look to it - more elongate and gracile, with a narrower aperture, more flared labrum, straighter columella with a longer fold at its apical aspect, and a more extensive parietal reflection than its lot-mates. These characters all tend toward *Samoana attenuata*, with which it occurs on Tahiti. **Fig. 5** shows a comparison of four shells, L to R: *S. attenuata*; an artificial mirror-image of the shell under discussion; the shell under discussion; and a typical *P. otaheitana* lot-mate of it. I'll let the reader decide if this constitutes a reasonable case for hybridization. *S. attenuata* lives high in the canopy, and *P. otaheitana*, while arboreal, is found much closer to the ground (Garrett, 1884). It appears that their isolation is more ecological than geographic, but what of the remote taxonomic relationship between the two putative parents? Based on the "genetic distance" between the two taxa, partulid expert Dr. Diarmaid Ó Foighil (personal communication 13 December 2011; Lee et al., 2009) is skeptical of my hypothesis. Such discord typifies the chinks in our knowledge of this wondrous group of snails.

Fig. 8 ***Le Château de Balaine*** **(sometimes rendered** ***Baleine*****), home to the Adanson family, was completed in 1850 and now serves as an upscale country inn within a 20-hectare botanical garden in France.**

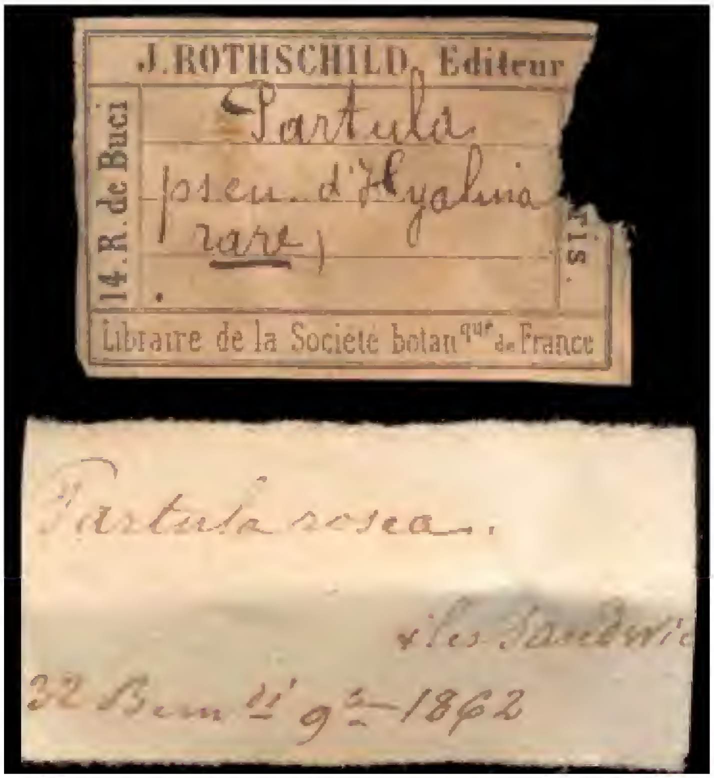
Man meddles with nature; Paradise Lost?

Readers are likely familiar with the far-flung introductions of the giant African snail, *Lissachatina fulica* (Bowditch, 1822), and the fragile nature of oceanic island ecosystems. The Society Islands fell prey to the invasion in the Twentieth Century and the adverse impact, most noticeably to agriculture, led to the deliberate introduction of the carnivorous rosy wolfsnail, *Euglandina rosea* (Férussac, 1821), on Tahiti in 1974, Moorea in 1977, and on other Society Islands in the 1980s and 1990s (Coote, 2007). While having little impact on the target giant African snail, this nonselective predator produced mass extirpations of partulids and the rapid extinction (in the wild) of the large majority of the 61 described endemic Society Islands partulid tree snails (4 *Samoana* and 57 *Partula* species). The impact is best documented on the island of Moorea (Clarke et al., 1984; Murray et al., 1988), where, within a decade of the arrival of *Euglandina*, all the once abundant partulids, 7 *Partula* and 2 *Samoana* species, were deemed extirpated (Murray et al., 1988; Lee et al., 2009).

There is some room for optimism, however: (1) Intensive on-going field surveys have detected scattered relict populations, seven (of the original nine) on Moorea, and several on a number of other islands (Lee et al., 2009; J. Slapcinsky, personal communication September 2011). (2) Perhaps in anticipation of the calamity, and certainly abetted by of the interest of laboratory geneticists as noted above, a number of Society Island partulids have been captively bred for decades (Coote and Loève, 2003). Attempts at reintroduction have thus far been unsuccessful, but the possibility looms on the horizon (Ó Foighil, 2009). Despite the carelessness of humanity, perhaps partulids will someday reach the level of prosperity to which Andrew Garrett and others bore historic witness.

The Adanson Dynasty; their scientific activities and the "Adanson Family Collection"

The primogenitor and most famous member of a noble succession of naturalists, collectors, and horticulturalists was **Michel Adanson** (1727-1806) [**Fig. 6**]. From 1749 to1753 "Le Savant," as he came to be known, endured the rigors of life in Senegal, then a French colony. His charge was to observe, and gather specimens of, the biota of this wild tropical west African region. Adanson's intention was to publish several accounts of all elements of the flora and fauna that came under his notice (Dance, 1986), but only one major iconography [**Fig. 7**] was produced. Fortunately for malacology, it dealt exclusively with the mollusks (Adanson, 1757). Besides being a lavishly illustrated and logically-organized iconography greatly superior to anything of its ilk that appeared earlier, it contained a novel system of classification based on the animals' soft anatomy. Adanson also employed a system of nearly consistent binominal nomenclature using Latin and Senegalese epithets. Readers may note that the date of publication (1757) anticipated that of the Tenth Edition of the *Systema Naturae* (Linnaeus, 1758) by one year. Apparently there was considerable debate about the acceptance of Adanson's names, the French School retaining them for some decades. Nonetheless, this work precedes the (admittedly arbitrary) beginning of zoological nomenclature (ICZN Art. 3.1), so Adanson's names are not available, except as validated by later authors. The mild controversy notwithstanding, Adanson's taxonomic system was a sentinel contribution to malacology, and posterity has exalted him into the pantheon of malacological Masters.



J. ROTHSCHILD, Editeur

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Partula
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Fig. 9 ***Partula*** **data labels showing that Major Emile Doûmet received these shells from J. Rothschild, Éditeur du Libraire de la Société Botanique de France, Paris, in 1862. The Rothschild source was indicated on most of the labels.**

In ca. 1760 Adanson gave what was thought to be his most important shells to King Louis XV along with plants and other natural history objects collected in Senegal in return for a life annuity. It appears that the politics of the First Republic interfered with delivery of this largesse inasmuch as Michel Adanson spent

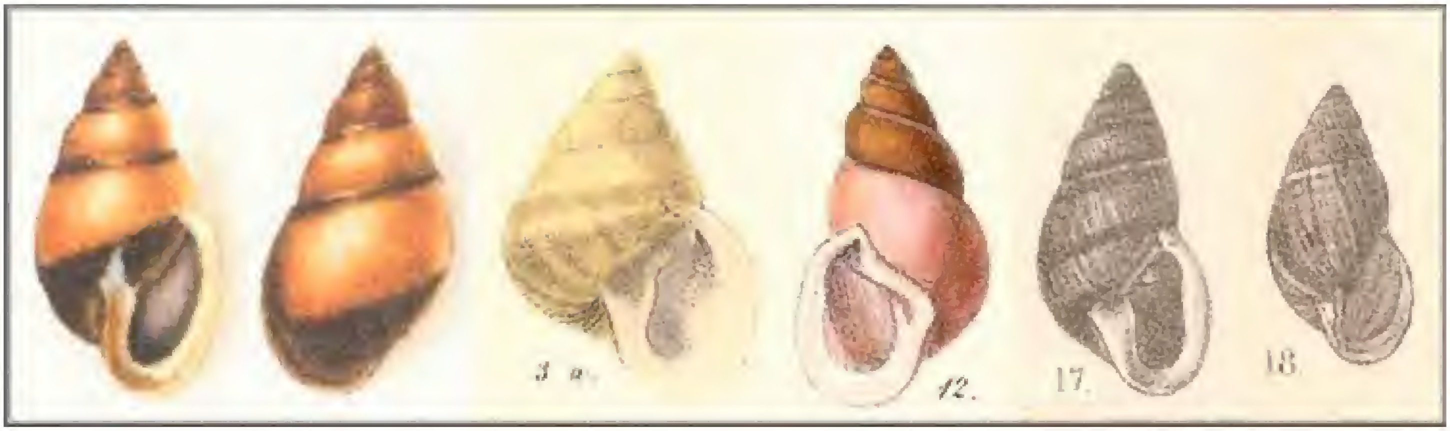


Plate 1. Classical original figures of French Polynesian *Partula* species.

L to R: [*Limax*] *faba* from Thomas Martyn (1784: pl. 67, middle two figures, of four, edited just for juxtaposition); *Partula inflata* and *P. rubescens* from Lovell Augustus Reeve (1850: pl. 1, fig. 3a; pl. 3, fig. 12 respectively); *P. stenostoma* and *P. suturalis* from Ludwig (Louis) Pfeiffer (1856: pl. 17, figs. 17, 18 respectively).

much of his later life in abject penury (M. Adanson website, 2011). It also appears this royal shell collection has been lost (Lamy, 1929). Once again fortunately for malacology, Adanson (and his heirs) actually retained the most important of the Senegal shells, including virtually all those figured in his magnum opus. These specimens were discovered in 1939 and given by Adanson's great-great-great grandson, Hugues Marie Auguste Michel de Rocquigny-Adanson (see below), to the Muséum National d'Histoire Naturelle (MNHN), Paris (Fischer-Piette et al., 1942). Also included in the donation was material gathered by Michel in various parts of France and from the West Indies, likely brought to him in Senegal by slavers. Likely his brother, **Jean-Baptiste Adanson** (1732-1804), a professional interpreter to royalty and amateur archaeologist living for a half century in Syria, Egypt, and Tunisia, accounted for the portion of material collected on those shores (Lamy, 1929; Fischer-Piette, 1942). Here follows a climb down the Adanson family tree with attention to family members sharing their antecedents' taste and talent for natural science, especially malacology.

Michel Adanson was:

Father of **Aglaé-Catherine Adanson Doûmet** (1775-1852), his only daughter, who in 1804 began creation of an arboretum in an area with optimal climate, soil, and terrain in the countryside 18 km from Moulins, in the Département of Allier. In 1812, at age 30, and in the wake of a divorce, she retired to the premises and began construction of a grand residence, Le Château de Balaine (sometimes rendered Baleine), completed in 1850, but with some elements said to date to the Fourteenth Century. The edifice is now an elegant country inn [**Fig. 8**]. The arboretum, perhaps better termed a botanical park, presently covers 20 hectares and is the largest privately-owned botanical garden in France. Continuously maintained for over 200 years, it contains 2,500 varieties of plants, including many installed by Aglaé herself. Glowing testimonials to its excellence (e.g., Anon., 1902) are many and continue to the present.

Uncle to an as yet anonymous man whom J.C.H. Crosse (1826-1898) credited with sparking his interest in shells when the latter was fifteen years of age (Poyard, 1899). All efforts by me and my referee, Dr. D. Callen, failed to clarify this genealogical connection.

Grandfather of **Paul-Anacharsis Doûmet** (1801-1880), brother of Emile, horticulturist and botanist who directed the Arboretum at Balaine created by his mother, Aglaé.

Grandfather of **Major Emile Doûmet** (1796-1869), son of Aglaé and an accomplished conchologist and prodigious general collector, he lived and collected in Cette (rendered "Sete" after 1827), in the south of France, for much of his life and eventually accumulated collections of "all sorts" over a span of "sixty years" (Crosse and Fischer, 1870; Lamy, 1929: 316). After his death, his son, Paul-Napoléon Doûmet-Adanson, created "Le Musée" on the grounds of the Château de Balaine in 1879-1880 (Lamy, 1929: 316; Fischer-Piette et al., 1942: 109-113; Anon., 1902). The Musée was an extensive and eclectic museum containing fine and spectacular paintings, statuary, porcelains, archaeological and ethnological artifacts, Napoleon Bonaparte memorabilia, and other compelling pieces among some 200,000 objects in all, mostly accumulated by the Major (Anon., 1902).

This *Partula* assortment I received from Alain was certainly assembled by Major Emile Doûmet. It was part of a shell collection once containing over 100,000 specimens of 10,000 species already suffering from curatorial neglect a century ago (Anon., 1902). The Major almost certainly assembled this *Partula* collection in great part through purchase from, and/or exchange with, contemporaries A.C. Bernardi (d. 1863; Crosse and Fischer, 1864) and J. Rothschild, Éditeur du Libraire de la Société Botanique de France, Paris [see **Fig. 9**], the latter source being indicated on most of the labels [see **Figs. 1, 2, 3**]. These collectors apparently provided material to Emile in July 1856, Sept. 1862, and August 1864. During those times, opportunities for travel to *Partula* country were limited for a variety of reasons, there were very few field collectors, and none is thus identified on Emile's labels. Some of the Cook, Cuming, and Lesson material was probably still circulating, but clearly much newer material was flowing into the collection. Andrew Garrett hadn't seen Tahiti until several months after the first date, but he was well-traveled in the Society Islands and certainly sent much material to Pease by the two later dates. Since Pease had extensive correspondence with European collectors (Clench, 1979), it seems the two Americans were the first links in the chain of ownership and that the bulk of material Emile was receiving had been "freshly-picked." In further support of this scenario are the several attributions of unpublished names to Pease years before validation (Garrett, 1884) [see **Fig. 3**]. As for the two lots accompanying the July 1856/Bernardi provenance, if Pease wasn't involved, perhaps they had a much earlier origin.

Great grandfather of **Paul-Napoléon Doûmet-Adanson** (1834-1897), who added to, and cared for, the collections of his father, Emile. Apparently unsuccessful at convincing the municipalities of Sete and Moulins to adopt these extensive holdings, he moved them from Sete and installed them at Balaine. At his death he left (to his family, it seems) a fine shell collection and library (Crosse, 1898). I found no evidence of any later member of the Adanson dynasty showing a particular interest in shells. Father of Marie.

Great-great grandfather of **Marie Cécile Louise Doûmet-Adanson** (1863-1892). Proprietor of the Château, Musée, and Arboretum de Balaine. Her husband, Guillaume Charles de Rocquigny (1852-1905) later added Adanson to his name. He was a well-respected botanist, horticulturist, lepidopterist, and mathematician. Father of Hugues. Host to annual meetings of the Société Scientifique de Bourbonnais.

Great-great-great grandfather of **Hugues Marie Auguste Michel de Rocquigny-Adanson** (1888-1959), son of Marie and Guillaume. In 1939, he played host to MNHN malacologist Edouard Fischer-Piette at Château de Balaine. At that time Fischer-Piette discovered Michel Adanson's Senegal collection. Hugues released this valuable material to the Paris Museum shortly afterward (see above). At the time Hugues was placed among the accomplished naturalists descendant from Michel (Fischer-Piette *et. al*., 1942: 110). *Natica rocquignyi* Fischer-Piette, 1942, was named in his honor, probably in consideration of unselfish service to the MNHN and posterity. Hugues had four children, the two youngest of whom, François (b. 1921) and Catherine, are still living. All were at the Château when the Michel Adanson Senegal Collection was released (Fischer-Piette *et al*., 1942).

Great-great-great-great grandfather of **Guillaume de Rocquigny** (1919-1973), second son of Hugues. Guillaume served as Proprietor of the Château, Musée, and Arboretum de Balaine and restored part of the château, and arboretum during his tenure.

Great-great-great-great-great grandfather of **Louise Courteix-Adanson**, who is serving her 39th year as Proprietor of l'Arboretum de Balaine, having assumed that position at the time of her father's death.

Thus, although there appears to be a prodigious shell collection at Château de Balaine, it is unlikely that any specimens that were in the hands of "Le Savant" remain. This material derives from the labors of his grandson, Major Emile Doûmet and great grandson Paul-Napoléon Doûmet-Adanson. These remnants, although vastly larger than Michel Adanson's material in terms of diversity and any other numerical metric, are of a lesser scientific value than that which was surgically excised and placed in Paris by Fischer-Piette seventy years ago. Nonetheless, this resource at Balaine may legitimately be characterized as the "Adanson Family Collection," a vibrant cultural asset that has survived successive monarchies, empires, and republics, and a measure of neglect hopefully to illuminate and entertain future generations.

Plate 2 (facing page). French Polynesian Partulidae, principally of the Society Islands. Two genera, 31 species, plus forms and subspecies arranged alphabetically: locality by island. Note * and † below.

Row one: 1. *Samoana attenuata* (Pease, 1864): *Raiatea; 2. †*Partula auriculata* Broderip, 1832: Raiatea; 3. †*P. bilineata* Pease, 1866: Tahaa; 4. †*P. callifera* L. Pfeiffer, 1856: Raiatea; 5. †*P. citrina* Pease 1866: Raiatea; 6. †*P. crassilabris* Pease, 1866: Raiatea.

Row two: 7. †*P. dentifera* L. Pfeiffer, 1852: Raiatea; 8. *P. dubia* Garrett, 1884: Tahiti; 9. *P. elongata* Pease, 1864: Moorea; 10. †*P. faba* (Gmelin, 1791): Raiatea; 11. †*P. fusca* Pease, 1866: Raiatea; 12. †*P. garretti* Pease, 1871: Raiatea.

Row three: 13. †*P. hebe* (L. Pfeiffer, 1846): Raiatea; 14. *P. hyalina* Broderip, 1832: *Tahiti; 15. †*P. imperforata* Broderip, 1832: Raiatea; 16. *Samoana (Marquesana) inflata* (Reeve, 1842): Nuka Hiva, Marquesas; 17. †*P. lugubris* Pease, 1864: Raiatea; 18. †*P. lutea* Lesson, 1831: Bora Bora.

Row four: 19. †*P. navigatoria* (L. Pfeiffer, 1846): Raiatea; 20. †*P. nodosa* L. Pfeiffer, 1851: Tahiti; 21. *P. nucleola* Garrett, 1884: Moorea; 22. *P. otaheitana otaheitana* (Bruguière, 1892): Tahiti; 23. *P. o. affinis* Pease, 1867: Tahiti; 24. *P. o. lignaria* Pease, 1864, solid brown: Tahiti; 25. *P. o. lignaria* Pease, 1864, banded: Tahiti.

Row five: 26. *P. o. rubescens* Reeve, 1850: Tahiti; 27. *P. o. sinistrorsa* Garrett, 1884: Tahiti; 28. †*P. planilabrum* Pease, 1864: Tahaa; 29. †*P. radiata* Garrett, 1884: Raiatea; 30. †*P. rosea* Broderip, 1832, f. *zonata* Pilsbry, 1909: Huahine; 31. †*P. rosea* Broderip, 1832, f. *cognata* Garrett, 1884: Huahine.

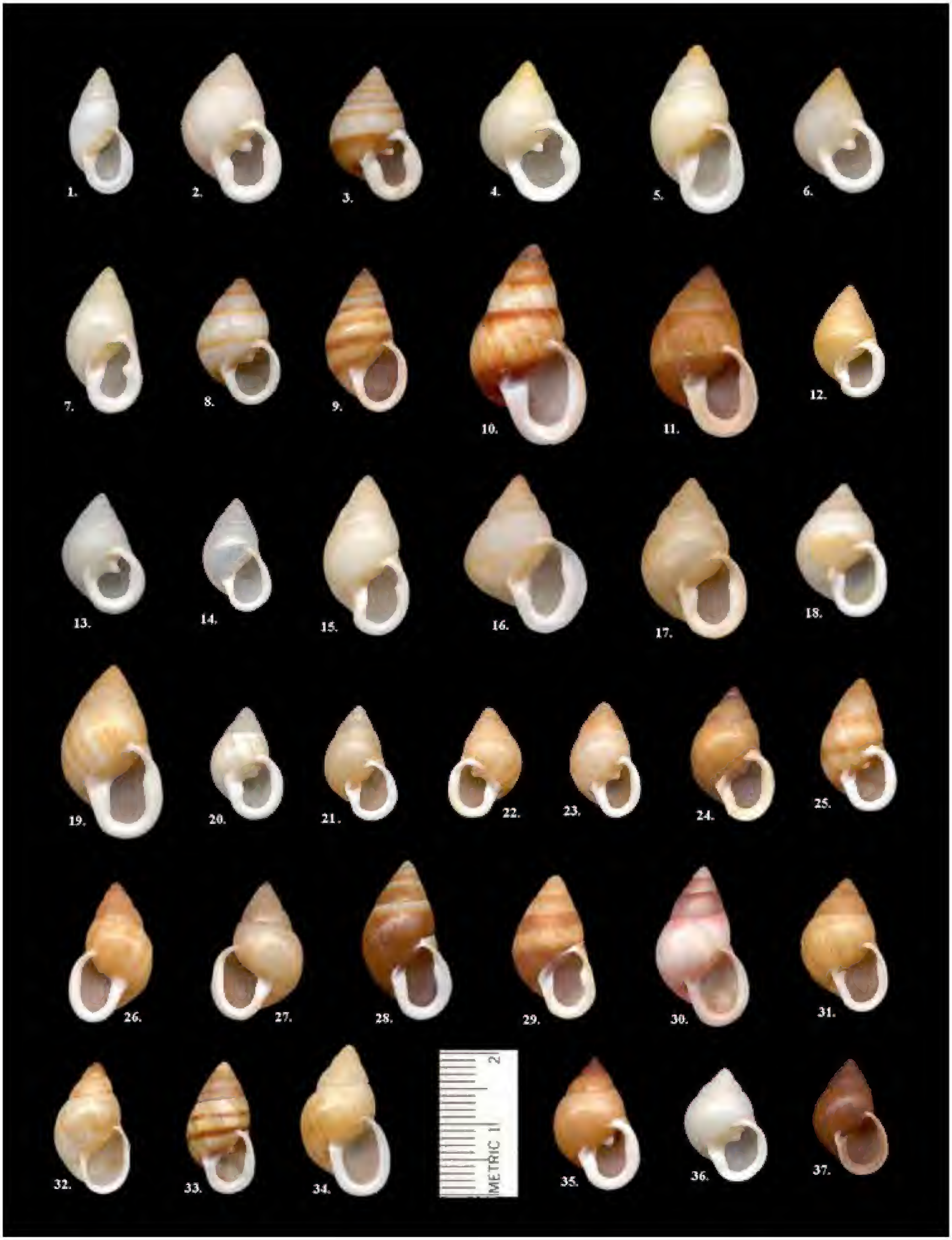
Row six: 32. *P. simplaria* Morelet, 1853: Huahine; 33. †*P. suturalis* L. Pfeiffer, 1855: Moorea; 34. *P. taeniata* Mørch, 1850: Moorea; 35. †*P. thalia* Garrett, 1884: Raiatea; 36. †*P. umbilicata* Pease, 1866: Tahaa; 37. †*P. varia* Broderip, 1832: Huahine.

*** indicates occurrence on at least one other island.**

† indicates extinct in nature. Of the 22 species-level taxa thus indicated, four (nos. 10, 13, 30-31, and 33) survive in zoos or labs (IUCN, 2011).

Summary and Conclusions

The acquisition of a small collection of pretty shells from far-away and long ago has compelled me to place these objects in an historical and biological context to better understand the manifold levels in which people and mollusks interact. Conchology may be a "light form of study" (Eliot, 1872: 113) to some, yet a contemporary of equal literary renown and, like Garrett before him, interred in *Partula* country, held that this form of study reaps greater rewards than those conferred by vast pecuniary riches (Stevenson, 1911: 45). The players and their works revealed in this *Partula* chronicle certainly conform far better to the latter perception.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SHELLS IN THE NEWS

From Josy Wiener of Boynton Beach, Florida, comes news of a display at the Ft. Lauderdale Museum of Art, titled "Journey Through Faith and Art." One of the displays is a model of a church in Amman, Jordan that is made of white marble with inlaid polished sea shells around the windows and doors. The model is made of inlaid shell pieces. The shells are *Haliotis iris* Gmelin, 1791, also called the paua or blackfoot paua, a New Zealand endemic renowned for its blue and silver nacre and often used for jewelry. (Photo credit unknown.)

From Ed Sossen of Hollywood, Florida, as printed in the Broward Shell Club newsletter, *The Busycon*, comes this, "Ed was recently at an antique show in Miami where he noticed a tiger cowrie - a common $1.00 "bin shell" on a dealer's table with a price tag of $200! When Ed asked why the high price the dealer replied…'Well, just look at the quality, they don't make them like that anymore.' Buyer beware." (Photo from Wikipedia.com.)

The July 2011 issue of *Scientific American* reported snails being sold in Paris, in which a land snail shell is purchased from "dustmen and ragpickers" and then stuffed with "lights or cats' meat," cut into a corkscrew form to fit the shell. The fake escargot is sealed with fat and sold to unsuspecting consumers. On Conch-L, David Campbell pointed out that "cats' meat" is actually meat intended for cats, rather than the meat of cats. Dick Petit then added that "lights" are lungs. As a closing comment, David Campbell stated the basic principle that, "...anything with enough garlic butter will taste like garlic butter sauce." (Photo from Wikipedia.com.)

Shrimp boats are a-comin' - there's shelling tonight: A high seas adventure to Trujillo Bay, Honduras

Karen VanderVen

Shell collectors have pursued the hunt for molluscan specimens from every type of floating object ranging from World War II landing craft to tiny inflatables. A lucky few recently had the opportunity to live aboard and shell from a 100-foot fully-fitted shrimp boat. The shells retrieved from this vessel were not the by-catch cast aside by shrimpers, but rather those found by an intrepid group of divers who, every night as the sun slipped below the horizon, stepped backwards into the black wavy Caribbean waters below.

The destination for this adventure was Trujillo Bay, a five mile semi-protected body of water surrounded on the coastal side by high mountains and the small town of Trujillo at the base of the mountainous Honduras coastline. Several rivers flow down from the mountains carrying rich nutrients that have produced a rich and varied ecosystem, including many forms of shell life that live and flourish on the Bay's sand and grass bottom.

Robert Masino was organizer and trip leader. Charles Rawlings, Steve Zinn, Marc Nathanson, and I were the divers who got to go along last April (2011). We were lured by the promise of such rare shells as *Conus harlandi* Petuch, 1987, *Conus sunderlandi* Petuch, 1987, *Vokesimurex cabritii* (Bernardi, 1858) (f. *donmoorei* Bullis, 1964), *Voluta polypleura hennequini* Petuch, 1995, as well as the potential for top adventure.

We spent the night before our embarkation for Trujillo at the Turquoise Bay resort on Roatan. There was time for an afternoon snorkel to a special spot where in the past there had been a colony of *Strombus pugilis* Linnaeus,1758. They seemed to be more scarce this time, but I was quite happy with several beautiful black and cream striped bivalves, *Chione cancellata* (Linnaeus, 1767) and a small *Fasciolaria tulipa* (Linnaeus, 1758). Next morning we boarded the shrimp boat *Captain Ron* and embarked on the five hour cruise to Trujillo Bay. With Robert's leadership and expertise on all aspects of the trip, and a large, helpful, and pleasant crew, we knew we'd be in good hands all the way.

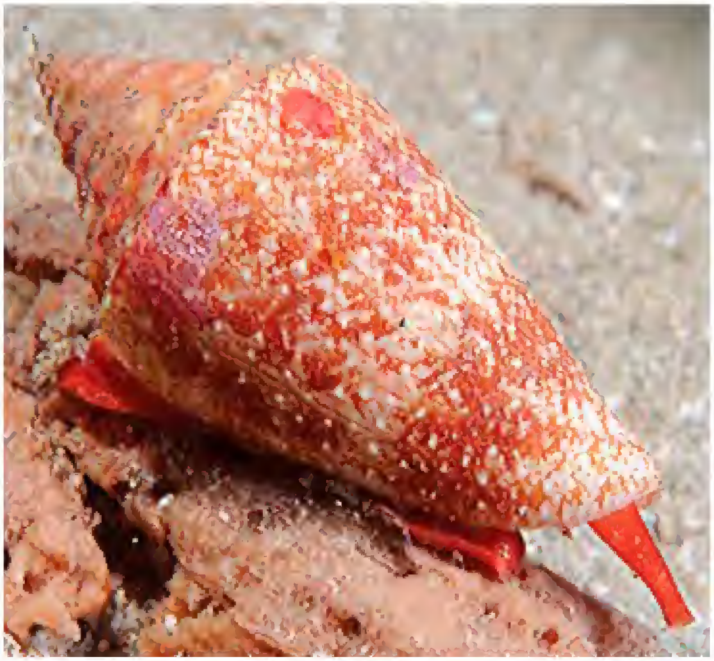
Boarding the *Captain Ron*. (Photo by M. Nathanson)

Above: Our leader Robert Masino checks our gear for a final time before heading to Trujillo Bay. (Photo by M. Nathanson)

Below: A view of the mountainous terrain around Trujillo Bay and our gear laid out in preparation for the night's dive. (Photo by M. Nathanson)

Scuppers and Suppers

Prior to the trip there was a bit of buzz. How would the divers enter the water when a shrimp boat rides high and there is no obvious opening or platform from which to step off? Even more challenging … how would they get back on after each dive? These questions were answered for good that first night. Here's how we did it. The divers, carefully steadied by the attentive and muscular crew, would step over the railing, one leg after another and put



Conus harlandi **crawling on a broken piece of coral. Although photographed during the day, like the other specimens, it was collected during a night dive. (Photo by author)**

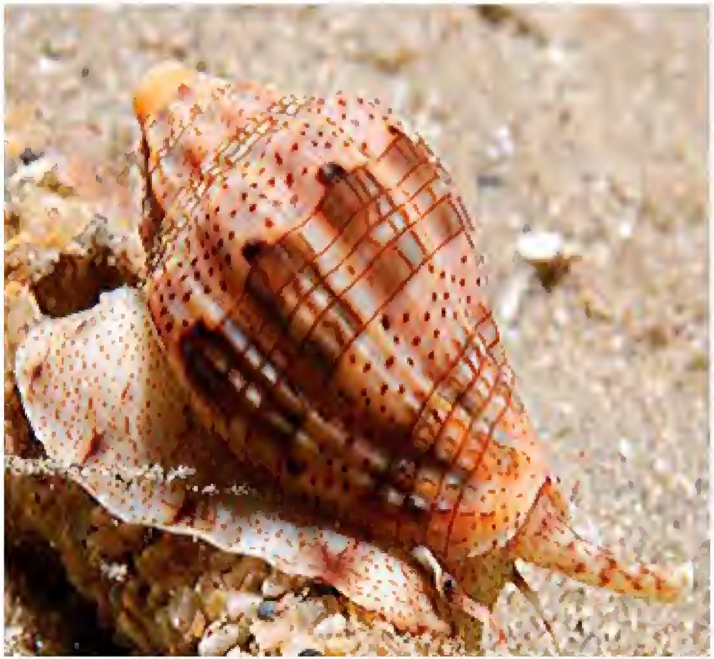
their fins through the scupper, the square opening in the metal wall going around the boat. They would be held while holding on to the railing, and putting one hand tightly over their mask then take a reverse 'giant stride.' I added an additional step of breathing.

"Bombs away" I mumbled into my regulator as I stepped off and in a nanosecond - the time it took to fall about 6 or 7 feet - hit the water, soon to continue my journey downward.

Getting back on? The crew would place a wooden ladder over the side and cluster at the top holding it down tight. I made a point of being sure to surface right under the ladder, coming up after the preceding diver had climbed up. Off with the BC and tank in the water where strong hands would hand it up to a crew member on deck. Then scamper up the ladder and over the railing where more helpful hands provided a steadying effect. Once on deck we could not wait to open our collecting bags and review the bounty we had brought up from the bottom.

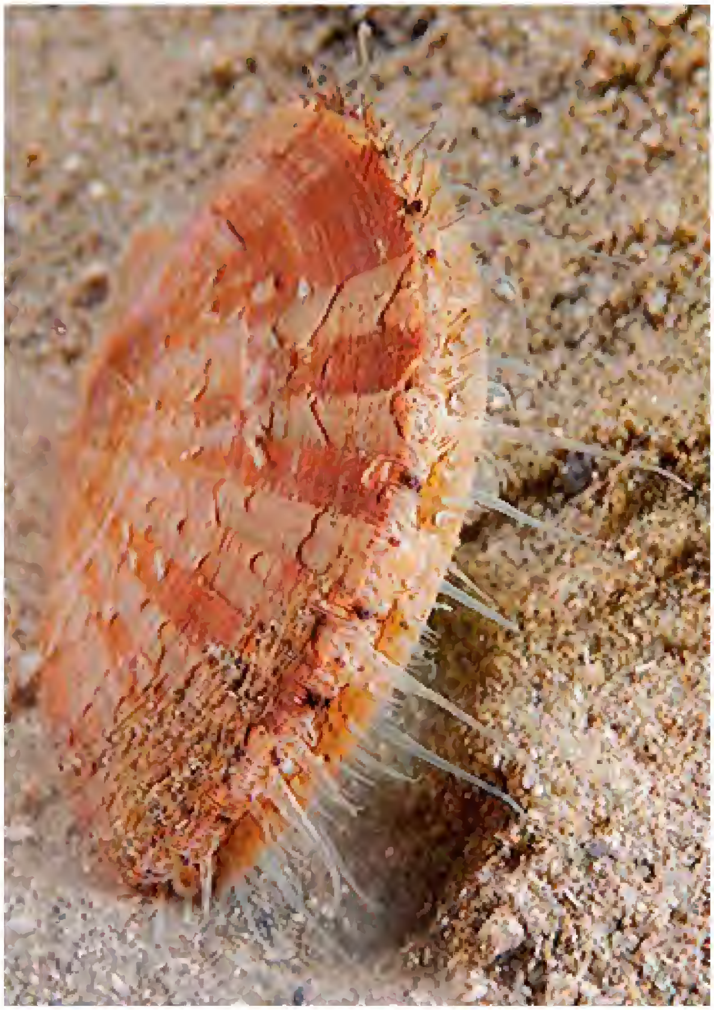
Nights, Lights, and Delights

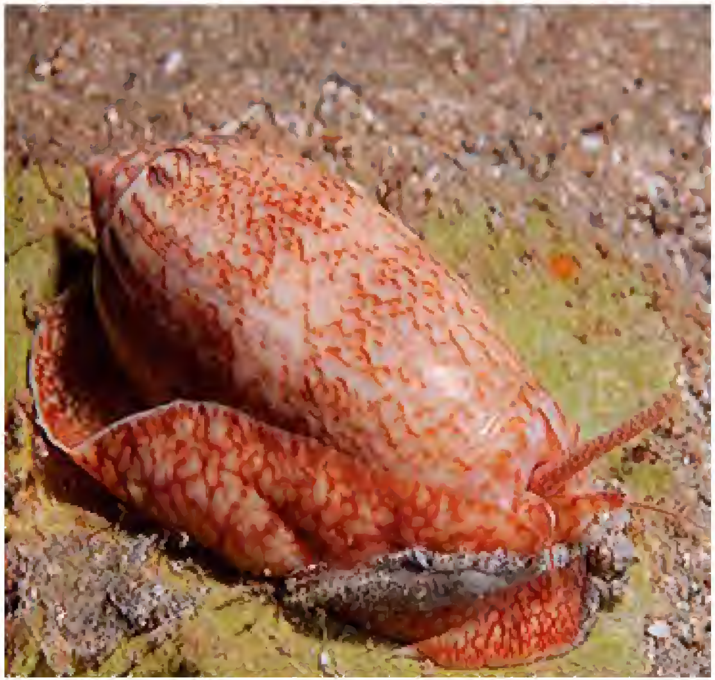
Most of the dives were between 30 and 40 feet deep, allowing us lots of time on the sandy and grassy bottom. We scanned this terrain with our bright dive lights and began to come up with the anticipated finds. There is no bigger thrill than when, in the beam of your light, there is a perturbation in the sand that you know will be something 'interesting.' For the cone aficionados (that is, everybody) there were the hoped-for fine specimens of the endemic rare cones, *Conus harlandi* and *Conus sunderlandi*. The *Conus harlandi* were particularly large, with distinctive brown markings. The *Conus sunderlandi*, with yellow orange dorsums and a band of white around the middle and at the base, brought joy to us all when we spotted them. There were also *Conus spurius* Gmelin, 1791, handsome shells that were more abundant. These would be out on top of the sand and each was a thrill to find. Collectively we all ended up with a beautiful size and pattern series to bring home. We found beautiful *Conus mindanus* Hwass,



Above: A juvenile *Voluta polypleura hennequini*, a stunning subspecies in the *Voluta musica* complex that is sure to be a favorite in any collection. (Photo by author)

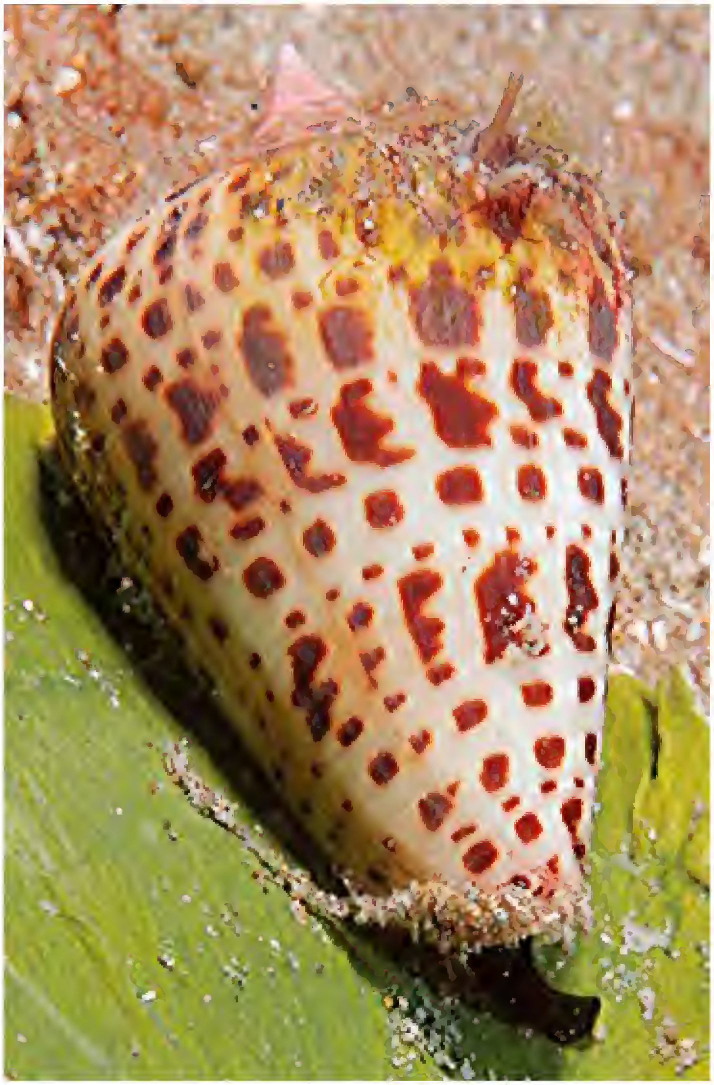
Below: The delicately sculptured and handsomely colored *Euvola ziczac*. (Photo by author)





Above: *Oliva reticularis* showing a nice reddish coloration.

Below: *Conus spurius* is a commonly found shell in the area, but always nice to collect. (Both photos by author)



1792 as well. Of course we ended up with some 'mystery cones' that nobody could quite place.

On one lucky night dive, I no sooner reached the bottom than I spotted two of the lovely *Vokesimurex cabritii* f. *donmoorei* out for a little walk (crawl?) in the grass. All of us found several specimens of this stunning shell with its perfect spines and rich orange brown, spiny dorsum. Adding to our murex finds were smaller *Haustellum rubidus panamicus* Petuch, 1990. Each night we found several darkly marked olives, *Oliva reticularis* Lamarck, 1811, in an endemic form.

The *Strombus* species found were: *Strombus pugilis, Lobatus costatus* Gmelin, 1791, and *Lobatus raninus* (Gmelin, 1791). The latter were exceptional in that they were dwarfs and more colorful than their more northerly counterparts. The *Strombus pugilis* were hardly ho-hum with incredibly rich dark orange apertures and large spines.

One night we wanted to try deeper water and headed down to 60 feet. Here, even a finger probe in the sand raised a cloud of visibility-killing silt. We started up at once. In spite of this, Robert not only miraculously retrieved several really lovely *Polystira albida* (G. Perry, 1811), but also generously shared them with us once we were on top.

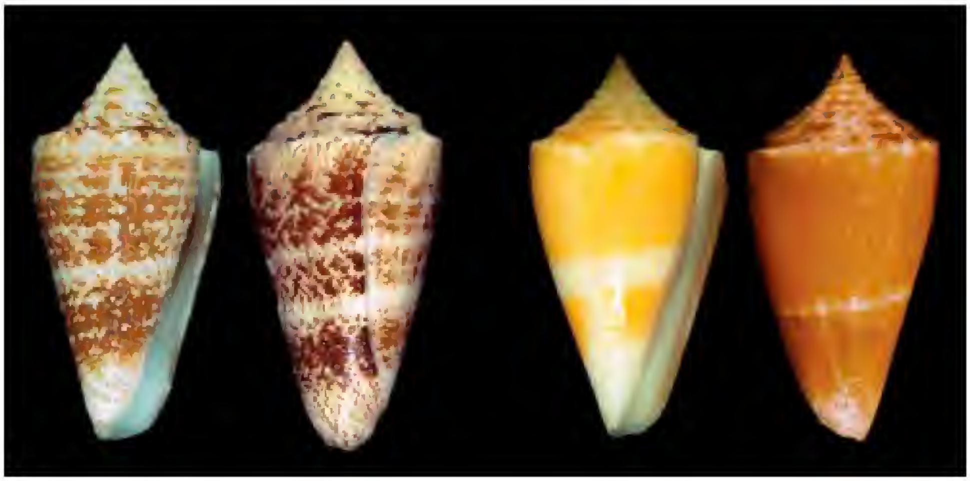
Members of the '*Voluta musica* complex' are always a treasure and, as with many of the other local forms, were richly colored. We all brought up the rich brown and purple *Voluta polypleura hennequini* Petuch, 1995. Other notable gastropod finds included *Xenophora conchyliophora* (Born, 1780), *Prunum oblongum* (Swainson, 1830), *Phalium granulatum* (Born, 1778), *Cymatium nicobaricum* (Röding, 1798*), Natica canrena* (Linnaeus, 1758), *Turritella exoleta* (Linnaeus, 1758), and an unidentified *Terebra* species.

Not to be ignored were the bivalves. Robert told us that the egg cockles found here were vibrant orange and yellow. I picked up a few small pairs, but Marc saved the day by sharing with me a large specimen as brilliant as the sunrise. Also dark and colorful were the brown mottled *Argopecten nucleus* (Born, 1778), that I found and added to my pecten collection. As a bonus, Robert handed me a colorful *Euvola ziczac* (Linnaeus, 1758). Even the arcas (*Anadara transversa* (Say, 1822) and turkey wings (*Arca zebra* (Swainson, 1853)) were attractive. Pairs of checkerboard clams (*Macrocallista maculata* (Linnaeus, 1758)), and king's Venus (*Lirophora paphia* (Linnaeus, 1767)) further enriched the bivalve take.

Between the first and second night dives our chef served up a hearty dinner that we hungrily scarfed down while standing up on the deck, using it to warm us as we looked forward to our next jump into the shell-filled waters. When we came up again, we'd have a snack and head for bed. Nothing felt better than climbing into my dry bunk and sipping a few drops of the firewater rum I bought in Roatan.

Sun and a Gun

Preceding the night dives were day-time photographing activities. Each night, selected live shells were placed in an aquarium to 'pose' for photographs in the morning. Charles rose at the crack of dawn - the sun came up early here - and took the shells and his underwater camera down to the bottom to photograph them *in situ.* Often I'd go down with him, circling the photography site like a shark, but without getting so close I spooked the operation.



Display specimens of *Conus harlandi* (left) and *Conus sunderlandi* (right). These beautiful shells are seemingly endemic to this area and both were greatly anticipated prizes we looked forward to collecting. (Photo by M. Nathanson)

(This was learned from a previous trip when I, with tunnel vision, made a beeline for a large cone I had spotted. My hand was just about to snatch it up when I saw Charles with his large underwater camera poised to photograph it and I backed off… just in time). These morning excursions were extra exercise for me and an opportunity to work off the bountiful meals I had been eating. There were few if any shells out, justifying our emphasis on the very productive night diving. We'd be out of the water before 7:00 AM.

Otherwise we didn't dive until the sun slipped below the horizon, and one might wonder how we whiled away the daytime hours. We would keep ourselves busy on the boat all day and the time flew by. A canopy was put up on the deck during the day to shelter us from the sun's bright rays. We could be found each day on deck treating our shells, showing them to the admiring eyes of the others, organizing our dive equipment, and reading (I was thankful for my Kindle). With time out for an ample lunch followed by an hour or so of spirited conversation, I would also retreat to my topside bunk where I could watch the lines on the masts as the wind came up in the afternoon. The more they shook and vibrated back and forth, as a wind indicator, the higher the waves we might expect to encounter for the night's dives. Mercifully there was no current and conditions permitted diving every night. The weather was nearly impeccable and I don't believe there was a drop of rain the entire time. We all marveled at the stunning sunsets each night as we anticipated it becoming just dark enough for us to take our first dive.

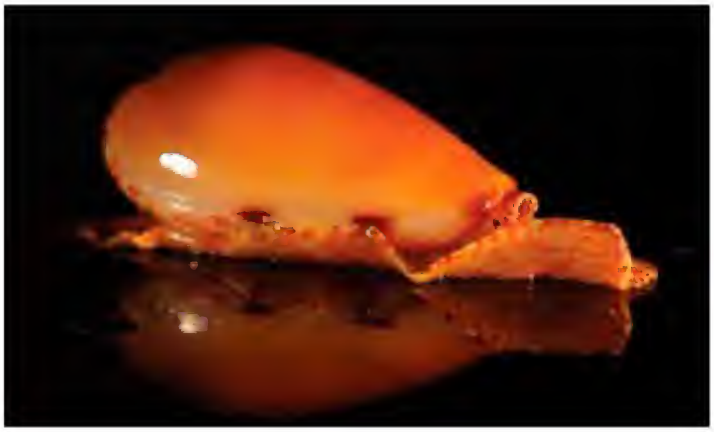
Of course it is not a live-a-board adventure trip in the tropics without being boarded by the local militia. Sure enough, one afternoon a skiff came alongside and on climbed a group of mostly young Honduran men, clad in camouflage and armed with large rifles. "All but the lady" were 'asked' to assemble out on deck while they searched the boat. I went out to stand on the deck with the men and it was not long until, having found everything in order, they were chatting pleasantly with all of us before they disappeared as fast as they had come, climbing down into their vessel and chugging off.

To Shore and More

Adding to the excitement of the trip were occasional trips away from the 'mother boat,' taking the dinghy to the shore, where Charles, Steve, and the crew explored both mangroves and shoreline. I was the lucky one since they slipped me some of the shells they brought back, which were different from those found diving. Charles handed me a clump of mossy oysters that I happily accepted. Cleaned up and displayed, they turn out to be *Isognomon bicolor* (C.B. Adams, 1845) and are beautiful with their unusual shape and nacreous interiors. Steve added a set of bubble shells (*Bulla striata* Brugiere, 1792) and a *Melongena bicolor* (Say, 1826). Even the crew got in the picture, bringing us a little bag of coquinas and periwinkles. All of these extended the scope and variety of my collection from this trip.

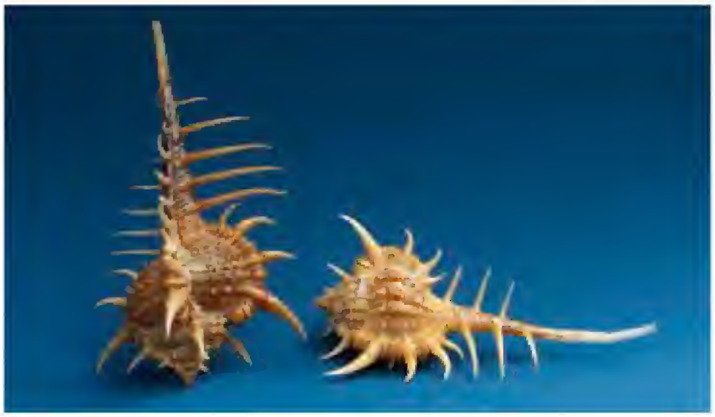
All too soon the eight days of diving were over and we prepared for the return to Roatan. Flying from Roatan to San Salvador, to Washington DC, and on to Pittsburgh, was enervating, but the opportunity for such a unique experience, with both the variety and rarity of specimens collected and the camaraderie with fellow shellers and crew, made the trip memorable and worthwhile.

Karen VanderVen
KVANDER@pitt.edu



Above: A *Prunum oblongum* photographed alive by R. Masino.

Below: *Vokesmurex cabritii* f. donmoorei is an elegantly shaped murex. (Photo by M. Nathanson)



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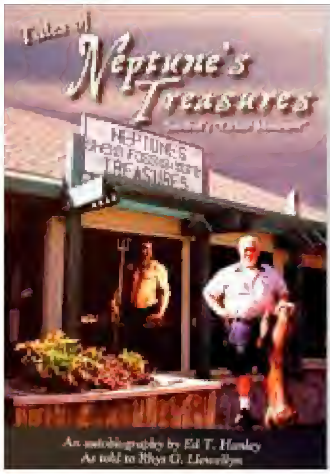
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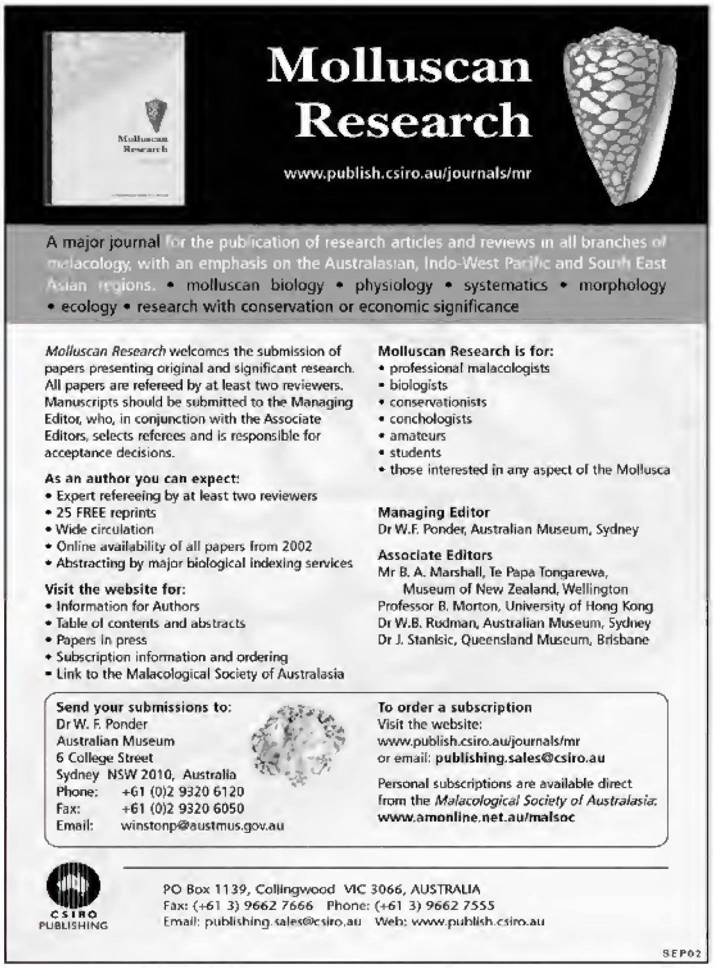
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Studying local adaptation in *Crepidula* spp.

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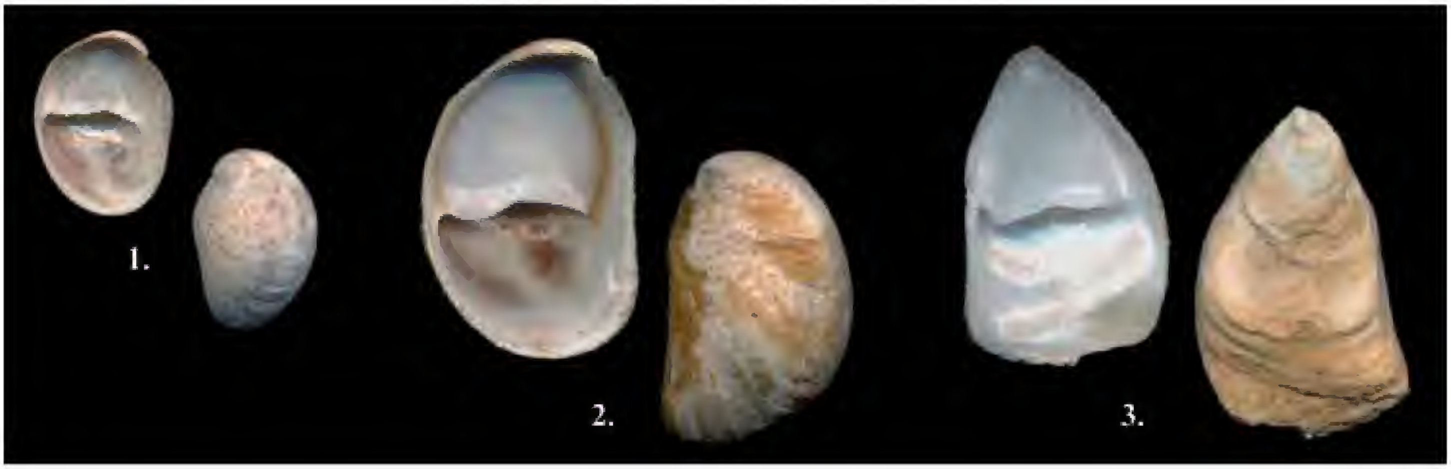

1. *Crepidula convexa* Say, 1822, 2. *Crepidula fornicata* (Linnaeus, 1758), and 3. *Crepidula plana* Say, 1822, are all shells commonly collected along the east coast of the US, and yet there is still much unknown about these common species.

I am interested in how organisms can adapt to ongoing climate change and how patterns of adaptive evolution are influenced by dispersal. In marine invertebrates this means comparing species with dispersing planktotrophic larvae that can live in the water for weeks with direct-developing species whose young crawl away from their mother (or egg sac) as juveniles. In my dissertation research, I am hoping to answer questions relating to how different dispersal types in the gastropod genus *Crepidula* can influence extant and potential adaptation to warming temperatures.

During the summer and fall of 2011, I conducted research funded in part by a fellowship from Conchologists of America to investigate local adaptation to temperature in larvae and juveniles of *Crepidula fornicata*, *C. plana*, and *C. convexa*, three species native to the east coast of North America. *C. fornicata* and *C. plana* have planktotrophic larvae that live in the water for 2-4 weeks and *C. convexa* has direct-developing larvae. In previous dissertation work, I found that *C. convexa* has much lower gene exchange among populations than *C. fornicata* (see also Collin 2001), but I wanted to know if that translated to ecologically relevant differences in temperature tolerance. I chose to manipulate temperature in my experiments because the thermal regime along the east coast varies from generally cool north of Cape Cod to generally warm south of Cape Hatteras, with more seasonal temperatures in between these two biogeographic barriers.

I collected adult females of all three species from different populations along the coast (from Nova Scotia to Virginia) and reared their larvae in a common garden experiment at one of three temperatures: 12ºC, 20ºC, or 28ºC. These temperatures were chosen to represent maximum summer temperatures north of Cape Cod, from Cape Cod to Cape Hatteras, and south of Cape Hatteras, respectively. I measured larval growth, survival, and metamorphosis rates for four weeks. *C. fornicata* was represented at seven populations, while the other two species were only represented at three populations each.

As I expected, *C. fornicata* did not show a pattern of local adaptation. All populations grew, survived, and metamorphosed equally well at any given temperature. Metamorphosis was strongly temperature-dependent, regardless of population (no metamorphosis was observed at 12ºC). *C. convexa* and *C. plana*, however, show signs of local adaptation in survivorship, where northern populations survived better at 12ºC and more southern populations survived better at warmer temperatures. As I only had three populations each for these species, I am planning to investigate this problem further to see if the pattern of local adaptation holds with a larger sample size. I am particularly interested in why *C. plana*, a species with planktotrophic larvae, shows more similarities with *C. convexa* than with *C. fornicata*, another planktotroph. We know very little about the ecology of *C. plana*, so it is unclear why local adaptation might be occurring in this species. I also am hoping to get individuals from south of Cape Hatteras, where animals may already be warm-adapted, to add to my dataset.

Since *C. fornicata* appears to do equally well at all sites, the consequences of changing climate may be more uniform across the range of the species than in *C. plana* or *C. convexa*, where extant local adaptation may impede the ability of the species to shift with its moving bioclimatic envelope.

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Present at SCUM XVI but not in photo: James Preston Allen, Zoe Allen, Melissa Betrue, Martin Carreon, Jairo Correra, Yajaira Correa, Geraldine Kratz, Ed Maestro, Ulises Maciel, Alan Nunez, Mike Schaad.
(Image taken by Zoe Allen with the authors camera)

The 16th annual gathering of **S**outhern **C**alifornia **U**nified **M**alacologists (SCUM) was held in the John M. Olguin Auditorium, Cabrillo Marine Aquarium, San Pedro, CA. Despite the inclement weather the meeting was attended by thirty-five professional, amateur, and student malacologists and paleontologists on Saturday, January 21st, 2012. This informal group has continued to meet on an annual basis to facilitate contact and keep members informed of research activities and opportunities. In keeping these gatherings informal, there are no dues, officers, or publications. Other regional informal groups such as: Bay Area Malacologists (BAM), Mid-Atlantic Malacologists (MAM), Ohio Valley Unified Malacologists (OVUM), and FUM (Florida Unified Malacologists) have enjoyed continued success and hopefully additional groups of malacologists and paleontologists will meet in a likewise manner.

Host John Ljubenkov welcomed the group to SCUM XVI and in SCUM tradition all members present introduced themselves and give a short update about current mollusk related activities. Most presentations were informal but several were more detailed. Aquarium director Mike Schaad welcomed everyone to the aquarium and highlighted many of its accomplishments over the past 70 years. It was particularly refreshing to hear presentations by four graduate students of Ángel Valdés (California Polytechnic State University, Pomona). Students Jennifer Alexander, Jessica Goodheart, Dieta Hanson, and Jermaine Mahguib each presented their current thesis research on various aspects of opisthobranch phylogeny. Five students from nearby San Pedro High School also attended the gathering. More detailed presentations included those by Geraldine Kratz on the Port of Los Angeles and the development of an abandoned dock area for research facilities; Julianne Passarelli on the history of collections at the Cabrillo Marine Aquarum; Emile Fiesler on the historical vs. actual range of the Trask shoulderband snail *Helminthoglypta traskii traskii*; and Zofia Ksiazkiewicz on her research of land snail diversity vs. habitat preference in western Poland.

SCUM XVII will be co-hosted by Lindsey T. Groves (NHMLAC Malacology) and Mary Stecheson (NHMLAC IP) at the Natural History Museum of Los Angeles County on January 19th, 2013 as part of the museum centennial year.

SCUM XVI participants and their respective interests and/or activities:

Jennifer Alexander (Calif. Poly. Univ., Pomona): Researching the molecular phylogeny of Aplysiomorpha (sea hares).

Zoe Allen (San Pedro High School): Volunteers at the Cabrillo Marine Aquarium.

Jennifer Berdan (Calif. Poly. Univ., Pomona): Will begin graduate research on the possibility of *Haminoea japonica* invading southern California.

Kelvin Barwick (Orange Co. Sanitation District): Continues research on mollusk and polychaete faunas of the Southern California Bight. Kelvin is the current Western Society of Malacologists Treasurer and encouraged SCUM members to attend the next meeting in Santa Cruz, CA.

Hans Bertsch (San Diego, CA): Currently researching population densities of nudibranchs. Included in this study are factors such as endemism, vertical and horizontal distributions, and barriers. Study areas included localities in Hawai‘i, Mexico, and Oregon and compared taxa vs. their preferred prey, including bryozoans, cnidarians, and sponges.

Kari Eckdahl (Calif. St. Univ., Fullerton): A grad student under Doug Eernisse and researching southern California limpets.

Emile Fiesler (BioVeyda): Emile reported on a current project comparing the historical range vs. the current range of the Trask shoulderband snail *Helminthogylpta traskii traskii*. Historical collection records indicate that it is known from San Luis Obispo County to Kern County and Mexico. He recently observed 30+ living individuals in the Puente Hills of eastern Los Angeles County. This indicates a relict population left behind as urbanization separated this group from the actual species range of southeastern Los Angeles County to southern Ventura County.

Daniel Geiger (Santa Barbara Museum of Natural History): Will soon begin editing and producing Jim McLean's long awaited volumes on North Pacific shelled gastropods, which could be completed by mid 2014. Has nearly completed a major monograph on the Scissurellidae, which will be published by the Santa Barbara Museum of Natural History. He completely revised the Conchological Iconography on the family Haliotidae, co-authored with Buzz Owen, which should be available in March of 2012.

Jessica Goodheart (Calif. Poly. Univ., Pomona): Current graduate student researching the biogeography and molecular phylogeny of pleurobranch sea slugs (Opisthobranchia: Notaspidea).

Lindsey Groves (Nat. Hist. Mus., L.A. Co.): Continues research on fossil cowries and recently published papers on new species from California, Washington State, and Baja California Sur, Mexico. He also published a list of the fossil mollusks of Hawai‘i in the new books of Hawaiian marine and terrestrial shells by Mike Severns. Currently investigating introduced species of terrestrial and freshwater mollusks in California.

Dieta Hanson (Calif. Poly. Univ., Pomona): Dieta presented "Invasion of the sea slugs," her graduate research that focuses on *Haminoea japonica*, an invasive marine species in California and how it ended up in northern California, Italy, Spain, and France, and why it has not invaded southern California.

Chrystal Johnson (Calif. St. Univ., Fullerton): Currently a graduate student at Calif. St. Univ. Fullerton.

Zofia Ksiazkiewicz (Polish Academy of Science): Currently researching land snail diversity vs. habitat preference in wetlands of western Poland.

George Kennedy (Brian F. Smith & Assoc., Poway, CA): A SCUM co-founder, He continues work as paleontological monitor in San Diego County particularly in Pleistocene and Eocene formations. Continues his research of Pleistocene marine terraces of California and molluscan faunas of the Pliocene San Diego Formation.

Geraldine Kratz (Port of Los Angeles): First woman director of the Port of Los Angeles. Currently helping to develop 30+ acres of City Dock #1 for use by local universities and agencies including Univ. Calif., Los Angeles, Univ. So. Calif., Occidental Coll., the Calif. St. universities, for research facilities and docking space for research vessels.

Pat LaFollette (Nat. Hist. Mus., L.A. Co.): Research associate at NHMLAC, reviewing and rearranging the Pyramidellidae in the malacology collection. He collects micro mollusks from outcrops of the "Imperial Formation" near Palm Springs, California.

John Ljubenkov (Pauma Valley, CA): Invertebrate taxonomist and continues his research on mollusks and associated hydroids.

Ed Maestro (Cabrillo Marine Aquarium): Exhibits Director at the Aquarium and interested in red and white abalone aquiculture.

Jermaine Mahguib (Calif. Poly. Univ., Pomona): Jermaine presented his research on "ugly dorid" nudibranch phylogeny, one of the largest nudibranch groups. Preliminary results from phylogenetic trees revealed that better genetic support is needed.

Jim McLean (Nat. Hist. Mus., L.A. Co.): Jim continues work on his eagerly anticipated volumes on North Pacific shelled gastropods. He recently added collaborator Daniel Geiger (Santa Barbara Mus. Nat. Hist.) to the project to edit and produce the volumes, which could be published by mid 2014. His monograph of worldwide Liotiidae is nearly complete.

Alan Miller (Calif. St. Univ., Long Beach): Alan reported on an on-going research project on the longevity of the cowry *Mauritia mauritiana* on Coconut Island, Kaneohe Bay, Oahu, Hawai‘i. Over 22 years he marked 101 individuals with large numbers to determine their longevity and movement habits around the research area. Of those 101animals, 2 lived 20+ years, 6 lived 16 + years, but most lived between 4 and 14 years.

Jazmín Ortigosa (UNAM): Currently conducting a survey with a team of biologists and students of the fish and invertebrates in Alacranes Marine National Park, Yucatan Peninsula, Mexico. Has documented 400+ species through collecting and photography.

Julianne Passarelli (Cabrillo Marine Aquarium): Julianne is the Collections Curator and reported on the history of the Cabrillo Marine Aquarium shell collection and other marine invertebrate collections. Their goal is to database the collections and make it available for research purposes.

Mike Schaad (Cabrillo Marine Aquarium): Aquarium director. Has helped establish protection of the ecosystem network with southern California aquaria and works to educate the public about the marine environment.

Mary Stecheson (Nat. Hist. Mus., L.A. Co., Invert. Paleo): Recently promoted to Collection Manager and currently databasing and rearranging gastropod type collection.

Ángel Valdés (Calif. Poly. Univ., Pomona): Teaches Evolutionary Biology and continues phylogenetic research on opisthobranch gastropods of the Caribbean and Panamic provinces. Four of five of his students in attendance gave presentations.

Shawn Wiedrick (Pacific Conchological Club): President of the PCC and interested in all areas of shell collecting. Volunteers at the Nat. Hist. Mus. of L.A. Co., identifying micro-turrids of the Indo-Pacific. He gave a narrative of his various malacological projects including Panamic muricid research, travel to Aruba, and construction of 24 cabinets to house his growing shell collection.

Calvin Won (Cabrillo Marine Aquarium): Calvin is Collection Assistant for the Cabrillo Marine Aquarium and works closely with Julianne Passarelli.

FUM 2012 Florida United Malacologists

José H. Leal, Ph.D.

On February 11, 2012, The Bailey-Matthews Shell Museum (BMSM) hosted the third meeting of Florida United Malacologists (FUM). The one-day gathering was designed to facilitate and enhance communications among professional, amateur, and student malacologists, with topics including but not limited to biology, ecology, paleontology, archaeology, and conservation.

The State of Florida is endowed with a large surface area, a wealth of drainage systems, a diversity of ecosystems, a long coastline (spanning more than one bio-geographical region), and a relatively abundant number of researchers working on different aspects of malacology, including a large and productive group of collectors, non-professional researchers, and citizen scientists.

This year, presentations spanned marine, freshwater, and terrestrial mollusks, with subjects ranging from micro landsnails, clam aquaculture, and drilling by marine gastropods, to Florida's marine molluscan food webs and everything in-between. (Make sure you check more about FUM 2012 and its Abstracts & Programs on the Museum web site at http://shellmuseum.org/newsdetail.cfm?articleID=447.)

FUM follows the pattern established by similar informal gatherings such as the Bay Area Malacologists (BAM), the Southern California United Malacologists (SCUM), the Mid-Atlantic Malacologists (MAM), and the Ohio River Valley United Malacologists (OVUM). There is no need for formal membership and there are no dues, officers, or publications, however, presenters are required to submit a brief abstract limited to 150 words or less.

The first installment of FUM took place at The Bailey-Matthews Shell Museum in 2010. In 2011 the gathering was hosted by Dr. Gustav Paulay and his staff at the Florida Museum of Natural History in Gainesville. Next year's gathering will be hosted by Dr. Greg Herbert at the University of South Florida's Department of Geology in Tampa. Please include FUM 2013 in your plans if you are going to be in the neighborhood next year!

PROGRAM:

Chelsey Campbell & John Slapcinsky: New insights into diversity in Madagascar's acavid land snails.

John Slapcinsky & Harry G. Lee: Cryptic diversity in the land snail genus *Daedalochila* Beck, 1837 sensu stricto (Stylommatophora: Polygyridae) is revealed by DNA barcoding efforts and supported by new anatomical and conchological data.

Donald Swenson: Coral Cove update: a review of this year's specimen collecting and changing beach conditions along with a display of sample specimens.

Dennis Sargent: The naming of a new strombid species from northern New Zealand and the Kermadec Islands.

Melissa Broderick, Shirley Baker, John Scarpa, & Leslie N. Sturmer: Clam aquaculture in Florida: an overview of methods and challenges.

Aswani K. Volety, Katie McFarland, Molly Rybovich, Shirley Baker, & Patrick Baker: Temperature, salinity, and desiccation tolerance of the Green Mussel, *Perna viridis*, in Southwest Florida.

Shubhabrata Paul & Gregory S. Herbert: Prey-size selectivity in *Chione* species (Bivalvia) in the late Neogene of Florida: a reevaluation.

David J. Karlen, Thomas L. Dix, Barbara K. Goetting, & Sara E. Markham: Trends in the benthic community structure of McKay Bay.

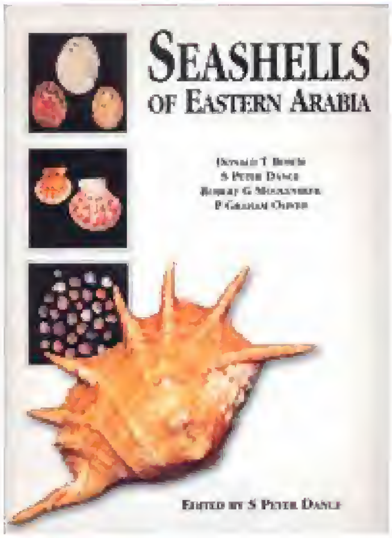
José H. Leal: The bivalve genus *Dilemma* (Bivalvia: Anomalodesmata: Poromyidae): bizarre clams hint at hidden deep-sea diversity.

Julie Zill: Host specificity and density of eulimid parasites (Gastropoda: Caenogastropoda: Hypsogastropoda) of holothurian hosts in Moorea, French Polynesia.

Subhronil Mondal, J. Hutchings, & Gregory S. Herbert: Obligatory edge drilling by the naticid gastropod *Polinices lacteus* from Florida.

Gregory S. Herbert & Allyson Imperio: Molluscan food web structure in Florida's marine ecosystems.

Dr. Donald Taeke Bosch (1917-2012) was born in Amoy (now Xiamen), China, to missionary parents. He married Hannah Eloise Boynton in 1942 and served as a medical officer in WWII. After the war, Don and Eloise decided their skills would be of best use as missionaries. In September 1951 they sailed from New York to England, flew on to Beirut, then finally arrived in Basra, Iraq. They spent a few days in Basra with friends before leaving for Amarah, Iraq, where they stayed until the end of 1954, training in language and other skills they would need in their posting in Oman.



In 1955, Donald started service in Oman as a surgeon in the Mission Hospital in Mutrah. He visited his patients all over the country, not just in the hospital. He often traveled on the back of a donkey or camel rather than by car. Many of his patients had never seen a doctor. The year 1970 proved to be a major transitional phase for Oman. His Majesty Sultan Qaboos bin Said al Said came to power and Oman moved steadily forward on the road of progress. In 1973 the Sultan bestowed the Order of Oman on Dr Bosch, the first American citizen to receive this honor.

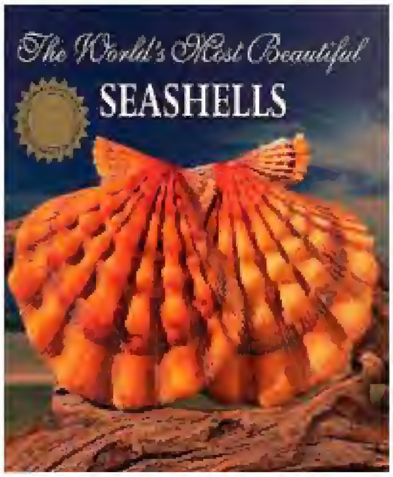
One of the favorite family activities was going to the beach or camping on the weekends. They visited remote places, like the now famous Masirah Island. Collecting shells in their spare time started as a family hobby, then became serious study, resulting in their first book, "Seashells of Oman."

In 1984, both Donald and Eloise retired from active mission work, dividing their time between residences in America and Oman. During periods in Oman after retirement, collecting shells became a passion and the number of new finds they made for the region grew steadily.

During 1989 they published their second book, "Seashells of Southern Arabia," a more popular and relatively inexpensive reference manual, written in English and Arabic. Then in 1995, with help from his Omani friends, and with S. Peter Dance as editor, Robert G. Moolenbeek for the gastropod section, and P. Graham Oliver (National Museum of Wales) for the bivalve section, he published his "dream volume," "Seashells of Eastern Arabia." [Much of the above is from an article on Donald Bosch by Robert G. Moolenbeek, published in the *American Conchologist*, March 2008.]

James Hammond Carmichael III (Pete) (1930-2011) was born in Augusta, Georgia, to Anne Moran and J. Hammond Carmichael. Pete attended grammar to high sSchool in Augusta and graduated from The Citadel in Charleston, SC, in 1952. He went on to study the Russian language at Syracuse University, NY.

Pete joined the military and after completing his tour of duty attended Mexico City College to earn a Master's Degree in Anthropology. Pete taught both anthropology and geology at universities in North Carolina, but his real interest was a growing fascination with photography, especially wildlife photography. He eventually retired from teaching to pursue wildlife photography full time. He and his family moved to Sarasota and Pete began his photographic journey.



He was the photographer for "Shells" by Dr. R. Tucker Abbott, "Seashells" and "The Audubon Field Guide to North American Shells" both by Dr. Harald A. Rehder, and his photos are in many of the "Florida's Most Fabulous Series" of nature books. Pete has been called "the world's foremost shell photographer" and proof of this status is a book he published with the late Leonard Hill, "The World's Most Beautiful Seashells" (above). His work also appeared in a number of magazines, including: *Audubon*, *National Wildlife*, *Nature*, *Ranger Rick*, etc.

Of course, he photographed much more than shells and had an uncanny knack in finding hidden treasures in many of the rain forests of Central and South America. In his own words, "I've done nature photography for many years, shifting whimsically from one obsession to another. Spiders, though, became a long-lasting fascination when I met with so many unfamiliar beauties while living in Mexico in the 1960s." Examples of Pete's close-up photographs of spiders can be seen at: www.awesomespiders.com.

Pete was a multilingual artist, musician, photographer, teacher, and athlete. He approached life with an exuberance that showed through in his superb photographs.

Preliminary report on the possible effect of the Deepwater Horizon oil spill in the Gulf of Mexico on the molluscan fauna of the surrounding area

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In August 2011 I joined a group of biologists from the University of Louisiana, Lafayette**,** on board the R/V *Pelican* for a third trip to inspect the area surrounding the Deepwater Horizon oil spill in the Gulf of Mexico. The spill occurred on April 20, 2010, at 28°44'12"N, 88°23'13.8"W (see map) and lasted for about three months. On two previous campaigns we sampled the area: in December 2010, and in April 2011. Some of the more important molluscan findings of the first two cruises have been reported already in *American Conchologist* [39(3) 4-9]. The area covered by the three cruises was roughly from 27°58'N to 29°26'N and from 87°34'W to 91°01'W (see map), at depths from approximately 16 m to 1760 m. The three campaigns were purposely spread throughout a year's time, to be sure that seasonal changes were not the cause of the results obtained. All three cruises brought similar but mixed results.

Oil was not found visually in any of the hauls, and only one haul, this on top of one of the banks or "pinnacles," had a weak odor of petroleum. Dredging done on a mud bottom at 80 m and deeper produced a rich live molluscan fauna; on a mud bottom between 16 and 50 m we netted only two species: *Oliva sayana* Ravenel, 1834, and *Solenostira cancellaria* (Conrad, 1846).

The dredging done on the shallower calcareous-rubble tops of the banks off the Mississippi Delta had different results. Sampling on Sackett Bank (approximately 28°38'N, 89°33'W and 55 to 70 m in depth; see map and Table 1), which had formerly netted rich results, was very disappointing, and the bank seemed to be biologically stressed. Sampling on Ewing Bank, situated west of Sackett (approximately 28°06'N, 91°02'W and 50 to 60 m in depth; see map), produced somewhat better results. I should add that a colleague who has worked with algae on these pinnacles for a number of years and who participated in all three campaigns, also found both banks very disappointing. The good news, at least for her, is that upon bringing some rock samples to her lab and placing them in aquaria, she managed to grow a number of species otherwise unnoticeable in the field.

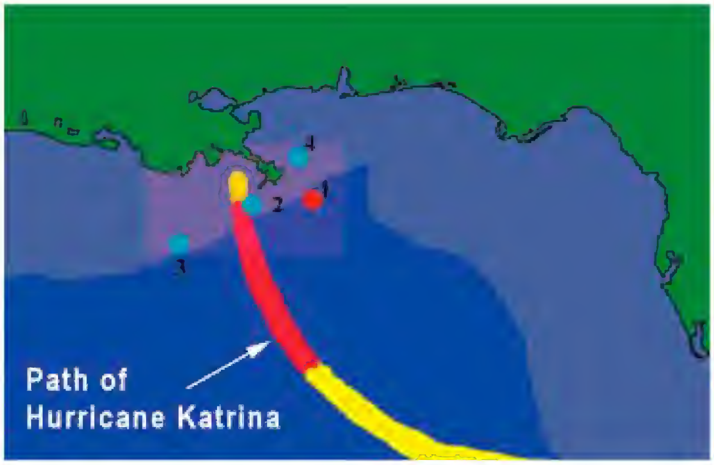
What was the cause of the biological stress in these banks? The expected oil was nowhere to be found, so was it then the large amount of oil dispersants used? Oil has always been part of the Gulf of Mexico ecosystem, particularly concerning deep-water ecology. The obvious health of mollusks in deeper-water benthos encountered in all three campaigns seems to attest to the fact that if oil had reached that area, the mollusks (and crustaceans) were not affected. Man-made chemicals that could alter the ecosystem may not have reached those deeper zones, or if they did, they may have been much more diluted in the deeper water column.

I have a friend who worked with the clean-up crew for the *Exxon Valdes* spill in March, 1989, using solvents to clean the shore rocks that were covered with oil. When she went back five years later, the rocks that were cleaned with solvents were still clean, but those that were left alone had a variety of marine life growing on them. From what I have read about oil dispersants, there seems to be a general consensus on the beneficial results concerning seabirds, marine mammals, and coastal marshes, but the jury is still out with regard to its toxicity to different species of marine life; the possible harm dependent on many variables, such as the type of solvent, molecular structure, concentration, water temperature, type of species, etc. The greatest harm, it seems, may not come from the dispersant itself but from the creation of smaller oil droplets, now more toxic than before the oil was "dispersed."

There are two other suspects in the list of possible culprits for the biological stress of, at least, Sackett Bank. One is the ever-increasing amount of nitrogen and phosphorous that comes down the Mississippi from farming, animal waste, and other pollutants. These products have created a "dead zone" in the Gulf of Mexico due to hypoxia, which usually occurs when too much decomposing organic matter prevents the production of enough oxygen in the water, either through photosynthesis or by atmospheric absorption, to maintain a healthy biota. The area of the "dead zone" in the Gulf is constantly changing, but it usually covers only coastal areas from Alabama to Louisiana. At this point there is no basis to believe that hypoxia is affecting the offshore banks in question.

The other possible suspect, and the data seems to show that this is most probably the original culprit, is hurricane Katrina, which on August 28, 2005, became a category 5 hurricane in the north-central Gulf of Mexico. According to the National Oceanic and Atmospheric Administration (NOAA), Katrina had maximum sustained winds of 170 miles per hour prior to landfall (http://www.ncdc.noaa.gov/special-reports/katrina.html). Katrina maintained Category 5 status (shown in red on the map) until it passed over the top of Sackett Bank (see map) and hurricane-strength winds extended 120 miles from the center. Was this force enough to disturb the surface of a bank 60 to 80 m deep? I believe that the answer is "yes."

I visited Sackett Bank for the first time in 1996, and the single dredge haul produced 16 lots of mollusks. We went back in 2004, and this time 5 hauls produced 88 lots, many of the species having been collected from the "grunge" brought home to sort. We did not go to Sackett in 2005, when Katrina passed through the area, but campaigns done in 2006, 2008, 2010, and April and August 2011 (see chart below) netted a total of only 31 lots in 22 hauls, that is 1.4 lots per haul *vs.* 104 lots in 6 hauls, or 17.3 lots per haul before Katrina. After Katrina, dredging done on top of Sackett produced rubble, but no "grunge," the finer sediment that netted so many species in 2004. Where was it? It was when I asked myself this question that I decided to take a closer look at that titanic hurricane. If Katrina was strong enough to affect



Map showing path of hurricane Katrina. Area in red shows Katrina at Category 5. Area in pink shows the general area covered by the three campaigns of the R/V *Pelican* in December 2010, April 2011 and August 2011. 1) Deepwater Horizon oil spill; 2) Sackett Bank; 3) Ewing Bank; 4) Alabama Bank.

the top of Sackett, the "grunge" removed fell into a soft, muddy bottom, and any possible living specimens carried with it (adult and juvenile alike) would have died. One must remember that, for all practical purposes, these pinnacles are submerged islands and I believe that the species dislodged from the upper calcareous surface into the surrounding soft mud would have "drowned," just as if it had been from land to water.

Ewing Bank, farther to the west, seems to have fared slightly better (see map and TABLE 2). The cruises of 2000 and 2004 to that bank produced 30 lots in 2 hauls, or 15 lots per haul. Sampling in 2006, 2008, 2010, and 2011 produced a total of 85 lots in 29 hauls, or 2.93 lots per haul. While Sackett's post-Katrina sampling produced only 8% of pre-Katrina lots, Ewing's post-Katrina production was 19.5%.

Although pre-Katrina data are limited, the tables below do show a drastic reduction of molluscan diversity after the 2005 hurricane; however, 6 years after Katrina one would think that Sackett and Ewing Banks should have begun to show some sign of recuperation, but the data does not support that conclusion.

There are no obvious differences in collections made post-Katrina and post-oil spill in either bank; however, closer scrutiny of the species collected at Sackett Bank in 2006 shows a larger percentage of living specimens [including the uncommon *Chicoreus (Siratus) consuela* (Verrill, 1950) and the rare *Conus* sp. aff. *riosi* Petuch, 1986] than was found in later dredgings, and the data suggest that perhaps these two banks may have deteriorated further after the oil spill.

I have records for a third bank located in the area of this study. The data here are more sparse because there are no pre-Katrina records and only one pre-oil spill record. The bank is located off the Alabama coast (approximately 29.15'N, 88º20.5'W, 75-90 m in depth; see map and Table 3). Although the data, such as they are, shows a reduction in the number of species from the single pre-oil spill haul, the samplings done in April and August of 2011 netted a number of species rarely collected in the northern Gulf of Mexico, such as a freshly-dead *Pseudosimnia vahniningi* (M. Smith, 1940) and a live *Pazinotus bowdenensis* (Vokes, 1970), as well as a live specimen of *Anna florida* García, 2008, the first record for the species in this area of the Gulf, dead or alive. The results for this bank do not seem to be the same as those of the Louisiana banks. The effects of the oil spill should have been the same, but Katrina was farther to the west.

Did the oil, or oil dispersants, hinder a possible comeback for the banks off Louisiana or were the banks so affected by Katrina that to-date they have not had a chance to recuperate? The data for the Louisiana banks seem to suggest so, but not that of the Alabama bank, which is more to the east, and deeper, and therefore not as affected by the hurricane. Is perhaps the "dead zone" expanding offshore enough to affect the banks off the Mississippi delta, particularly after the effects of Katrina? Other than the fact that Katrina must have given the first preliminary blow to these areas, one can only speculate at this point.

The three cruises made after the Deepwater Horizon oil spill were supported by the National Science Foundation and the Gulf Research Initiative grant. Dr. Emily Vokes, Professor Emerita, Tulane University, reviewed this paper and made some important editorial suggestions.

TABLES

TABLE 1. SACKETT BANK: approximately 28º38'N, 89º33'W; 55 to 70 m in depth.

YEAR	# OF HAULS	# OF LOTS	LOTS/ HAUL
1996	1	16	16
2004	5	88	17.6
Total	**6**	**104**	**17.3**
2005	KATRINA		
2006	5	8	1.6
2008	4	7	1.75
2010 (Apr.)	OIL SPILL		
2010 (Dec)	3	3	1
2011 (Apr)	4	3	0.75
2011 (Aug)	6	10	1.66
Total	**22**	**31**	**1.4**

TABLE 2. EWING BANK: approximately 28º06'N, 91º02'W; 50 to 60 m in depth.

YEAR	# OF HAULS	# OF LOTS	LOTS/ HAUL
2000	1	21	21
2004	1	9	9
Total	**2**	**30**	**15**
2005	KATRINA		
2006	3	14	4.7
2008	9	20	2.2
2010 (Apr.)	OIL SPILL		
2010 (Dec)	5	21	4.2
2011 (Apr)	3	16	5.3
2011 (Aug)	9	14	1.5
Total	**29**	**85**	**2.93**

TABLE 3. ALABAMA BANK: approximately 29.15'N, 88º20.5'W; 75- 90 m in depth.

YEAR	# OF HAULS	# OF LOTS	LOTS/ HAUL
2006	1	7	7
2010 (Apr.)	OIL SPILL		
2010 (Dec)	1	3	3
2011 (Apr)	3	7	2.3
2011 (Aug)	3	6	2
Total	**8**	**23**	**2.87**

Noteworthy offshore mollusks from the north-central Gulf of Mexico, including geographical extensions and a generic reassignment

Emilio F. García

The Gulf of Mexico is our North American Mediterranean, being shared only by the United States and Mexico. It is a relatively enclosed body of water, with outlets only through the Yucatán Strait and the Strait of Florida. This makes it a very interesting body of water concerning its biota, not only for the possibilities of endemism but also for the unexpected occurrence of certain species. Having been given the great opportunity of participating in many campaigns in the Gulf on board the R/ V *Pelican*, and having had access to unique collecting areas, I have been sharing my findings with the malacological community.

This is a continuation of reports of noteworthy molluscan species from the Gulf of Mexico, the last having been published in the September issue of this magazine (García, 2011). The taxa treated below, except for *Cuspidaria microrhina* Dall, 1886, *Conus ermineus* Born, 1778, and *Benthomangelia bandella* (Dall, 1881), were dredged in August 2011 during a campaign covering the offshore waters of eastern Louisiana, Mississippi, and western Alabama. Please, refer to the "Preliminary report" included in this issue (page 32) for further information.

***Hyotissa mcgintyi* (Harry, 1985) (Fig. 1)** - Although it has been reported from jetties in South Padre Island, Texas (Tunnell *et al*., 2010:323), this species inhabits deep water (see Mikkelsen & Bieler, 2008: 114). The specimen illustrated, our first, was dredged off the Alabama coast at 28°32.088'N; 89°22.396'W to 28°20.128'N; 89°23.410'W, in 688-776 m. Like *Neopygnodonte cochlear* (Poli, 1795), another deep-water bivalve reported in *American Conchologist* [39(3): 4-5, fig 3], it is a "foam oyster," and belongs to the family Gryphaeidae. It measures 44.4 mm.

***Cuspidaria microrhina* Dall, 1886 (Fig. 2)** - I have two records, a single valve each, of this interesting species. The first was dredged in 2006 in hard mud at 27°35.22'N to 27°33.13'N; 91°52.31'W to 91°47.55'W, in 600-960 m; the second, illustrated here, was dredged in 2008 at 28°05.009'N to 28°05.348'N, 91°11.365'W to 91°09.093'W, in 110-109 m. *Cuspidaria microrhina* was not reported as inhabiting the northwestern Gulf of Mexico in Turgeon et al. (2009), but it may have been recorded by Odé (1964- 2001) as *Cuspidaria cf. microrhina.* The specimen illustrated measures 38.6 mm.

***Cuspidaria rostrata* (Spengler, 1793) (Fig. 3)** - Another interesting deep-water, mud-dwelling species recorded here for the first time as inhabiting the western Gulf of Mexico. It was reported erroneously for this area by Turgeon *et al.,* (2009:738), most probably a *lapsus mentis* for *Poromya rostrata* (Rehder, 1943), which did appear in García & Lee (2005), the reference given by the former publication. The single specimen was dredged at 27°59.070'N, 91°04.279'W to 27° 58.821'N, 91° 05.651W, in 148-157 m. It measures 17.8 mm.

***Fedikovella beanii* (Dall, 1882) (Fig. 4)** - Formerly placed in the genus *Cocculina*, this species was first recorded from the Gulf of Mexico by Vokes & Vokes (1983:12; pl.23, fig.2); however, this record was questioned by Rosenberg (2009), presumably because of the poor condition of the specimen illustrated. Otherwise, the species has not been reported from the Gulf until now, in spite of the fact that several live specimens were collected in a single dredge haul attached to small pieces of old sunken branches. The specimens were collected at 28°32.088'N; 89°22.396'W to 28°20.128'N; 89°23.410'W, in 688-776 m. The specimen illustrated measures 6 mm.

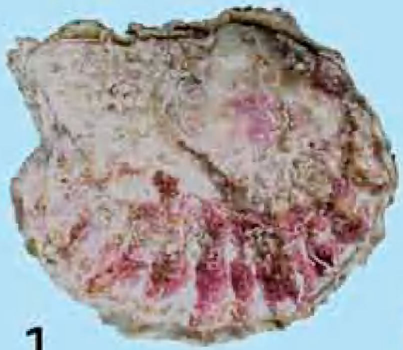
***Hyalorisia galea* (Dall, 1889) (Fig. 5)** - Although this species has been reported from the western Gulf (Rosenberg et al., 2009), this is the first time we have dredged it. Like *Fedikovella beanii*, described above, it needs a hard surface to survive, something very difficult to find in the muddy bathyal region that these species inhabit. The single live specimen collected, illustrated here, was dredged at 28°29.155'N; 89°32.159'W to 28° 31.870.N; 89°32.687'W, in 595-387 m, and was attached to a living *Propeamussium* sp.; this would have made it very difficult for the latter to "swim" given its relatively small, fragile shell. Presumably, it was the proportionally large "extension" of its valves that gave the animal enough propulsion to save the day. The *Hyalorisia* specimen measures 8 mm.

***Bursa rhodostoma thomae* (d'Orbigny, 1847) (Fig. 6)** - This western Atlantic subspecies and the Indo-Pacific *B. rhodostoma rhodostoma* (Sowerby, 1835) are, according to Beu (1998), very similar, differing only in apertural coloration. The western Atlantic subspecies is widely distributed, from North Carolina to the island of St. Helena in the southeastern Atlantic (Rosenberg, 2009); however, it does not seem to be common at any locality. The immature live specimen illustrated was dredged at Ewing Bank, 28°05.689'N; 91°01.915'W to 28°05.928 'N; 91°02.142W, in 55-56 m. It measures 22 mm. As it often happens with juveniles, I could not photograph the animal in its crawling position because every time it turned itself so, it would crawl with the animal unexposed. I don't blame it.

***Pazinotus bowdenensis* (E. H. Vokes, 1970) (Fig. 7)** - It has been very exciting the few times that this beautiful little muricid has come up in the dredge. The species was originally described as a Miocene fossil from Bowden, Jamaica (Vokes, 1970: 27-28; pl. 5, figs. 5a-5b); however, its Recent distribution seems to be confined to the northeastern quadrant of the Gulf of Mexico, with limits in the south at latitude 27.5°N (Rosenberg, 2009) and in the west at longitude 89° 33' (EFG 16938). The specimen pictured was dredged at 29°15.848'N; 88°20.146'W to 29°15.552'N; 88°20.319'W, in 87.3-88.3 m. It measures 10.2 mm.

***Anna florida* García, 2008 (Fig. 8)** - Specimens of this species initially came from both Florida coasts and Bermuda; however, just before publication of its description several specimens of *Anna florida* collected in Texas, and brought to my attention by Dr. Fabio Moretzshon, were discovered at Texas A & M University, Corpus Christi (see Tunnell et al., 2010: 214). The species had not been recorded from the central Gulf until the August 2011 campaign, nor had a live specimen been previously photographed. Two specimens were extracted from a hole in a rock dredged at 29°15.681'N; 88°20.237'W to 29°15.713'N; 88°20.219'W, in 78-86 m. The specimen illustrated measures 11.7 mm.

Conoidean taxa. The following conoidean taxa have been bounced around from family to family for many years. Fortunately, two papers recently published in the same journal, and meant to be read together, will render more stability to the "cones," "terebras,"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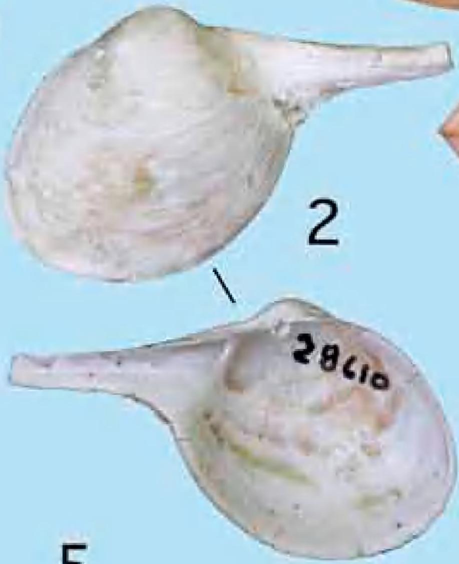
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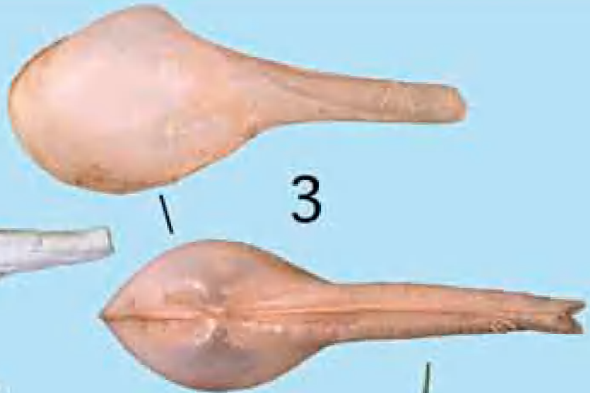
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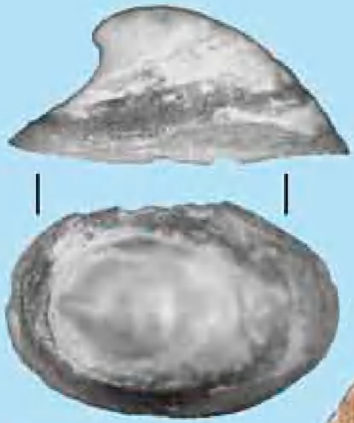
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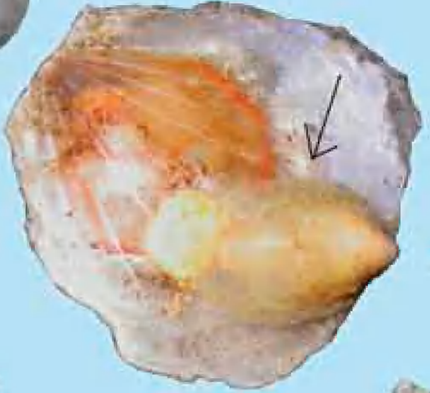
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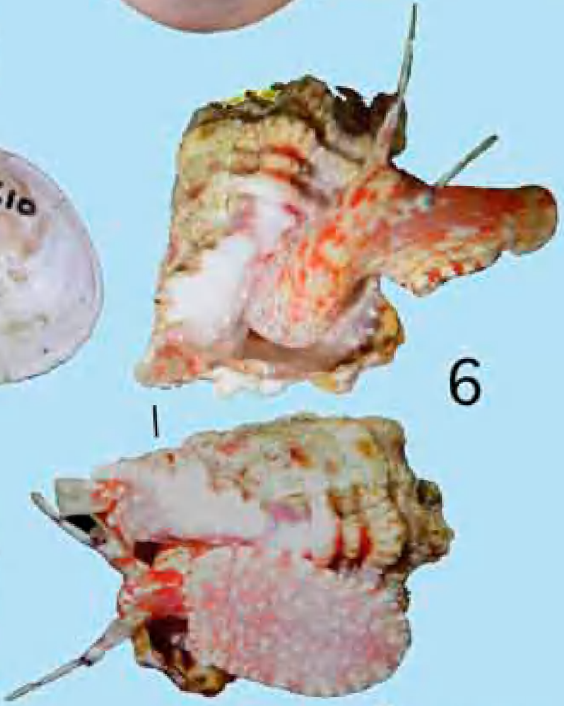
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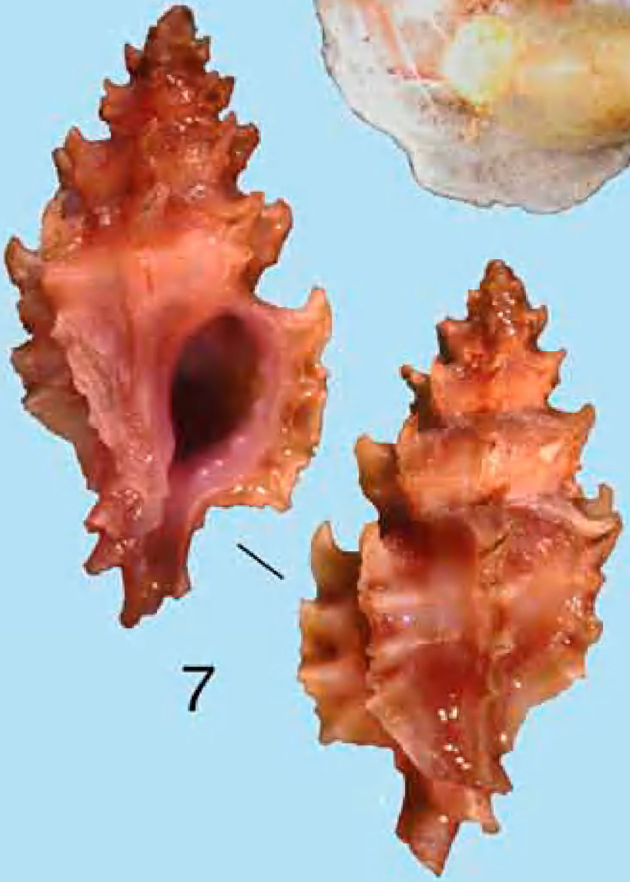
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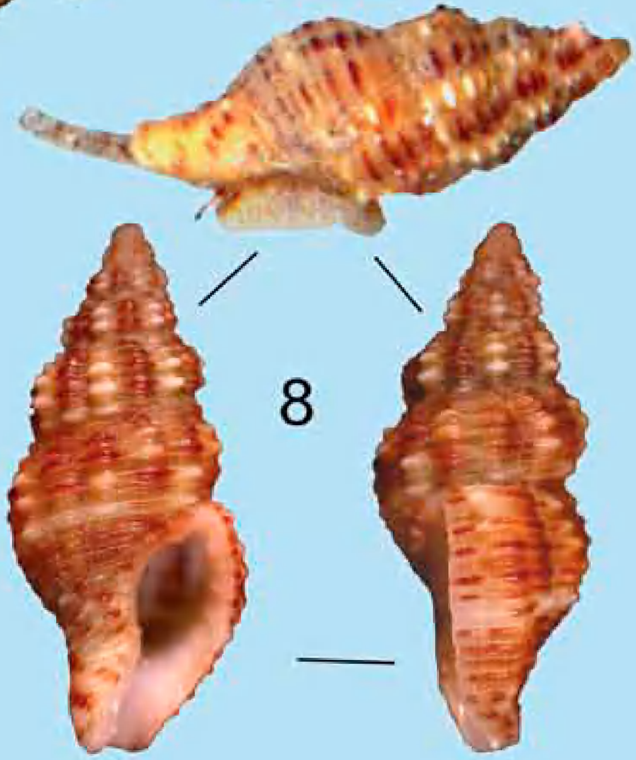
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and "turrids." Puillandre et al. (2011) present in their paper a molecular phylogeny of the Conoidea where, "for consistency of usage," and to the collector's relief, the families Conidae and Terebridae are kept as families. The "turrids," however, are split into 12 families of "comparable rank." Bouchet et al. (2011) follow up with a paper laying out a new operational classification of the Conoidea based on Puillandre et al. Accordingly, and following the discoveries in these two papers, the conoidean genera listed below are assigned as follows: *Conus*: Conidae; *Benthomangelia*: Mangeliidae; *Corinnaeturris*, *Glyphostoma*: Clathurellidae; *Leucosyrinx*: Pseudomelatomidae. The last assignation is "tentative" and hypothetical as, "anatomically, this is the most variable family of Conoidea." The authors state that "most genera were formerly included in the subfamily Crassispirinae, but the nomenclaturally valid name for this clade is Pseudomelatomidae." (Bouchet et al. (2011: 292).

Conus ermineus **Born, 1778 (Fig. 9)** - This relatively common species arguably achieves its most dramatic color patterns in the pinnacles of the north-central Gulf of Mexico. The 14.4 mm specimen illustrated here (EFG 22158) has a verrucose surface with unusually stepped whorls. As is the case with other juvenile cones (e. g., *Conus regius* Gmelin, 1791), it seems that some young *C. ermineus* also develop pustules on the surface of their shell. We have dredged two other specimens (EFG 22158, 23226) with such a characteristic. The illustrated specimen was collected in the 2000 campaign at 28° 0.561'N, 91° 02.205'W to 28° 05.524 N 91° 02.036'W in 58 m.

Benthomangelia antonia **(Dall, 1881) (Fig. 10)** - This taxon has been reported from the northwestern Gulf of Mexico before (García & Lee, 2004). It is illustrated here because it is the best specimen of this rare species collected by us. It was dredged at 28°54.535'N; 88°12.078'W to 28°56.811'N; 88°14.140'W, in 1136-1124 m and measures 15.5 mm. The specimen illustrated by Bouchet & Warén (1980: 47, fig. 106) is not that of *B. antonia* but of *B. bandella* (Dall, 1881). Although the epithet "*antonia"* is used both in the image and in their discussion of the species, this may have been a mix up in redaction, as the epithet "*bandella*" is listed in the introduction to the genus while "*antonia*" is not (p. 45). The photo shown in Williams as *B. antonia* (2005, species 5530, photo at left) is not that species.

Benthomangelia bandella **(Dall, 1881) (Fig. 13)** - The type locality for this species is Blake station 47, which is off the mouth of the Mississippi River. Although it has not been reported from elsewhere in the Gulf of Mexico, I have two lots from western Florida, as far south as 24°35.29'N (EFG 25313). The specimen illustrated was dredged off Alabama at 28°31.26'N, 87°40.64'W, in 2432- 2468 m. Although the maximum reported size is 9.4 mm (Rosenberg, 2009), the illustrated specimen measures 15 mm.

Corinnaeturris leucomata **(Dall, 1881) (Figs. 11- 12)** - Formerly placed in the genus *Pleurotomella*, presumably because the known specimens lacked a protoconch. Bouchet & Warén (1980: 77), with better specimens at hand, pointed out that this species has the unique character of a smooth, multispiral protoconch with a single keel, and erected the taxon *Corinnaeturris* to accommodate the species. The illustrated adult (Fig. 11) was dredged at 28°48.057'N; 88°05.040'W to 28°50.092'N; 88°02.178, in 1758-1726 m, and measures 17.6 mm. The juvenile (Fig. 12) specimen shows the distinguishing protoconch.

Glyphostoma golfoyaquense **Maury, 1917 (Fig. 14)** - This is the first time that this elegant *Glyphostoma* has been reported from the northern Gulf of Mexico. Two live specimens were dredged at 28°29.155'N; 89°32.159'W to 28°31.870.N; 89°32.687'W, in 595-387 m. The specimen illustrated measures 20 mm. The animal is white with unexpected orange mottling on top of the siphon and at the posterior end of the foot.

Leucosyrinx filifera **(Dall, 1881) (Fig. 15)** - When Dall first described this species he placed it in the genus *Pleurotoma* (1881: 56), stating that the nuclear whorls were "generally decorticated, but when perfect **probably** (my bold letters) as in the preceding species," which was described as having the sculptured protoconch of Daphnellinae (now Raphitomidae). Eventually, the taxon *filifera* was placed in *Gymnobela*, still in Raphitomidae, presuming, as had been the case with *Corinnaeturris leucomata* (above), that it had the characteristic protoconch of that family. The specimen of "*Pleurotoma*" *filifera* illustrated here has an almost intact smooth protoconch, with no trace of the sculptural ornamentation of raphitomids. The protoconch and other shell characters place this taxon in the genus *Leucosyrinx*. It was dredged at 28° 32.088'N; 89°22.396'W to 28° 20.128'N; 89°23.410'W, in 688-776 m and measures 20.5 mm.

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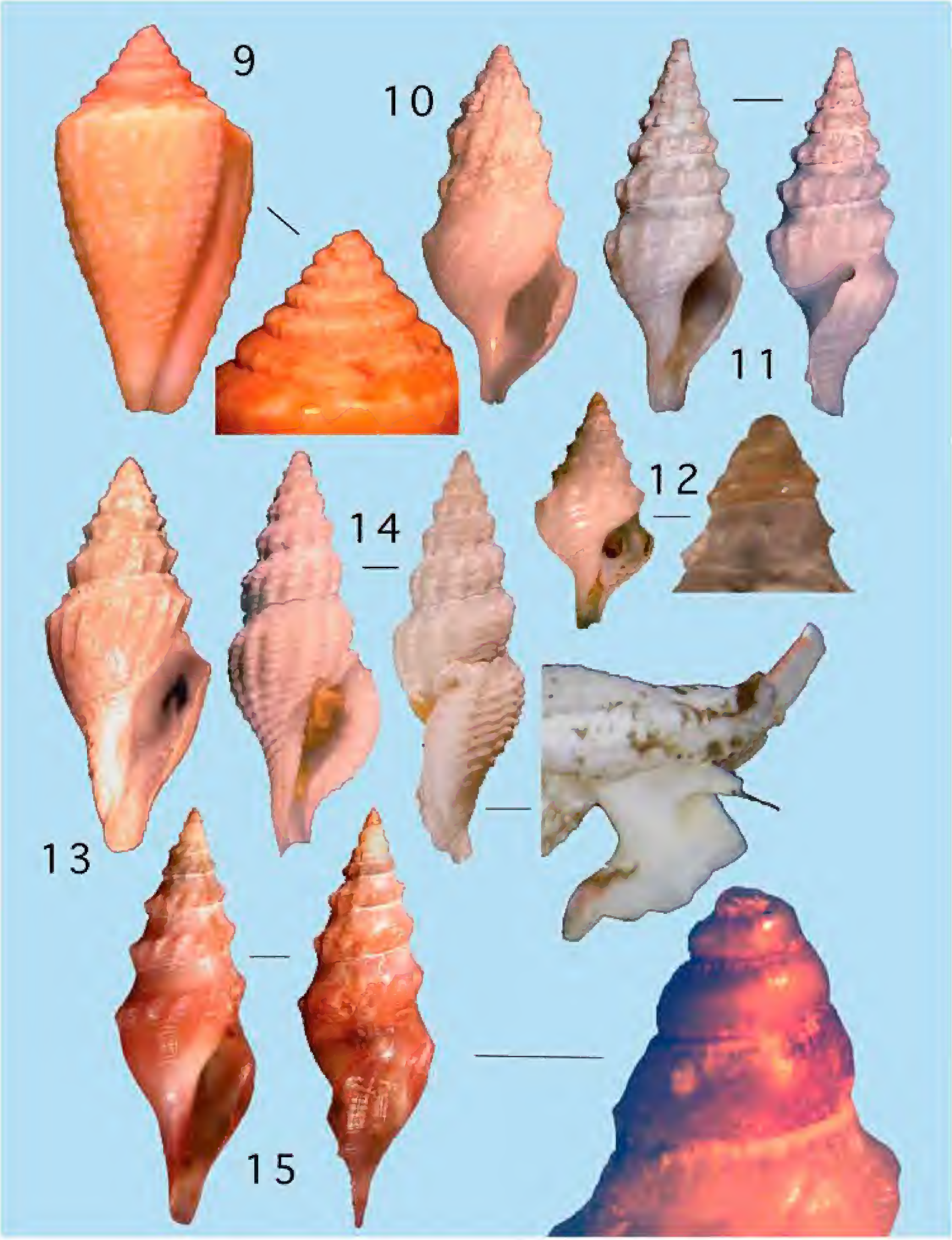
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Broward Shell Show 2012

Nancy Galdo

This year's Broward Shell Show was the best ever, a record breaking show. As before, the 47th annual Broward Shell Show was held at the Emma Lou Olsen Civic Center, in Pompano Beach, Florida. Attendance was up, with plenty of returning regulars and lots of newcomers. We increased our club membership by 31 new members! Of note were the many youngsters in the crowd - getting their introduction to the wonders and mysteries of conchology at a young age. We had a full slate of quality exhibits, and sincere thanks and appreciation go to the judges, exhibitors, dealers, and club members who participated in and ensured the success of the 2012 Broward Shell Show. Of special note was the display by Amy Tripp, that took three awards, including the COA Award. The Emma Lou Olsen Civic Center, in Pompano Beach is also where the club holds its monthly meetings on the second Wednesday of each month at 6:45 p.m. Annual dues are $18 for an individual or family, $5 for a student (thru high school), and $20 international. This year's show co-chairs were Nancy Galdo and Alice Pace.

Amy Tripp with well-deserved ribbons and awards for her three-case winning display of "Uncommon Beach Shells Collected From the Marco Island Area." She won the Conchologists of America Award, Jim Vunkannon Memorial Florida/Caribbean, and Shell of Show - Self-collected. This last was a near perfect specimen of *Conus spurius aureofasciatus* Rehder & Abbott, 1851.

The Emma Lou Olsen Civic Center, in Pompano Beach, Florida, has served as an excellent facility for club meetings and special events like the annual shell show.

Bob Pace was winner of the DuPont Award, the Gerrit deGraff Memorial, and Shell of Show - Any Manner, with a nicely-sized and near perfect muricid, *Poirieria oregonia* (Bullis, 1964).

Jonathan Galka won the American Museum of Natural History Award and the Len Hill Memorial Award for his display of "Pelagic Shelled Mollusks."

Valentino Leidi won Best Student Exhibitor with his scientifically accurate and educational display titled "Diversity in the World of Seashells."

Gene Everson is certainly no stranger to the award page of this magazine. Here he is with his display titled "Pecten Shells Worldwide," winner of Best of the Best.

Allan Walker (1921-2012) was an Honorary Life Member of the Jacksonville Shell Club (JSC) and for 37 years a major influence and guiding presence for the club.

Allan was born in Providence, Rhode Island, and served in the USAF in WW II as well as ten years in the Rhode Island Air National Guard. He married Hazel Barrs during wartime and their union lasted 67 years until his passing. The couple settled in Jacksonville in 1959 and Allan went to work for The Florida Times-Union/Journal. He retired from his position of press photographer in 1983. During his 24 years of service to journalism he was recognized with several national awards for his photography.

Allan and Hazel attended their first JSC meeting at the Citizens Federal Savings and Loan Association on University Blvd. in March, 1975. Their immersion was immediate and earnest as each won a blue ribbon in the Eleventh JSC Shell Show less than four months later. One, the other, or both the Walkers won ribbons and major awards, including Most Beautiful, Most Educational, The People's Choice, and the Maggi Wheldon Trophy at essentially every event for the next 20 years.

At the time of his retirement from the newspaper and following a short apprenticeship with the late Don Campbell, Allan went to work for the JSC. He served as Chairman of the Shell Show for five of the next six years, one of them, 1988, when he was club President. These were the halcyon Years of the Beaches' Flag Pavilion JSC shows, with exhibits stretching over 800 feet on some occasions. Allan's spectacular photographs of the events from the balcony of the vast auditorium were well-received and widely circulated, appearing in numerous publications.

Allan and Hazel's passion was education. In the mid-1980's they initiated the JSC Education Committee and began a series of talks to elementary school children. The emphasis of their curriculum was the living mollusk, and their teaching materials included a great number of animals preserved in their shells. Audience interaction was encouraged and the response was overwhelmingly positive. Overwhelming is a particularly apt descriptor; the Walkers, along with a retinue of JSC recruits, gave over 200 such presentations to thousands of children during those busy years and earned Allan the moniker "Shell Man." The Walkers and team also presented their programs to the JSC, at Jacksonville University, FCCJ (now FSCJ: Florida State College at Jacksonville), and Marineland.

As is evident from the preceding account, Allan Walker was pretty much inseparable from Hazel. While this abiding partnership produced a laudable volume of good works, those of us who knew these special individuals will probably remember the sense of fellowship that the Walkers brought to the JSC.

When Allan became stricken with a stroke in late 1994, the Walkers' JSC participation was curtailed, but they maintained contact. They donated their shell collection to the Mary Brogan Museum of Art and Science in Tallahassee, where, according to Aimee Hills-Hayes, Director of Education and Public Programs, it has illuminated audiences of tens of thousands. During his infirmity Hazel gave Allan the highest caliber of nursing care to which I have ever borne witness. As in health, clearly this nurse and patient were a perfect fit. [Text from Harry G. Lee, photo by Dale Bulock]

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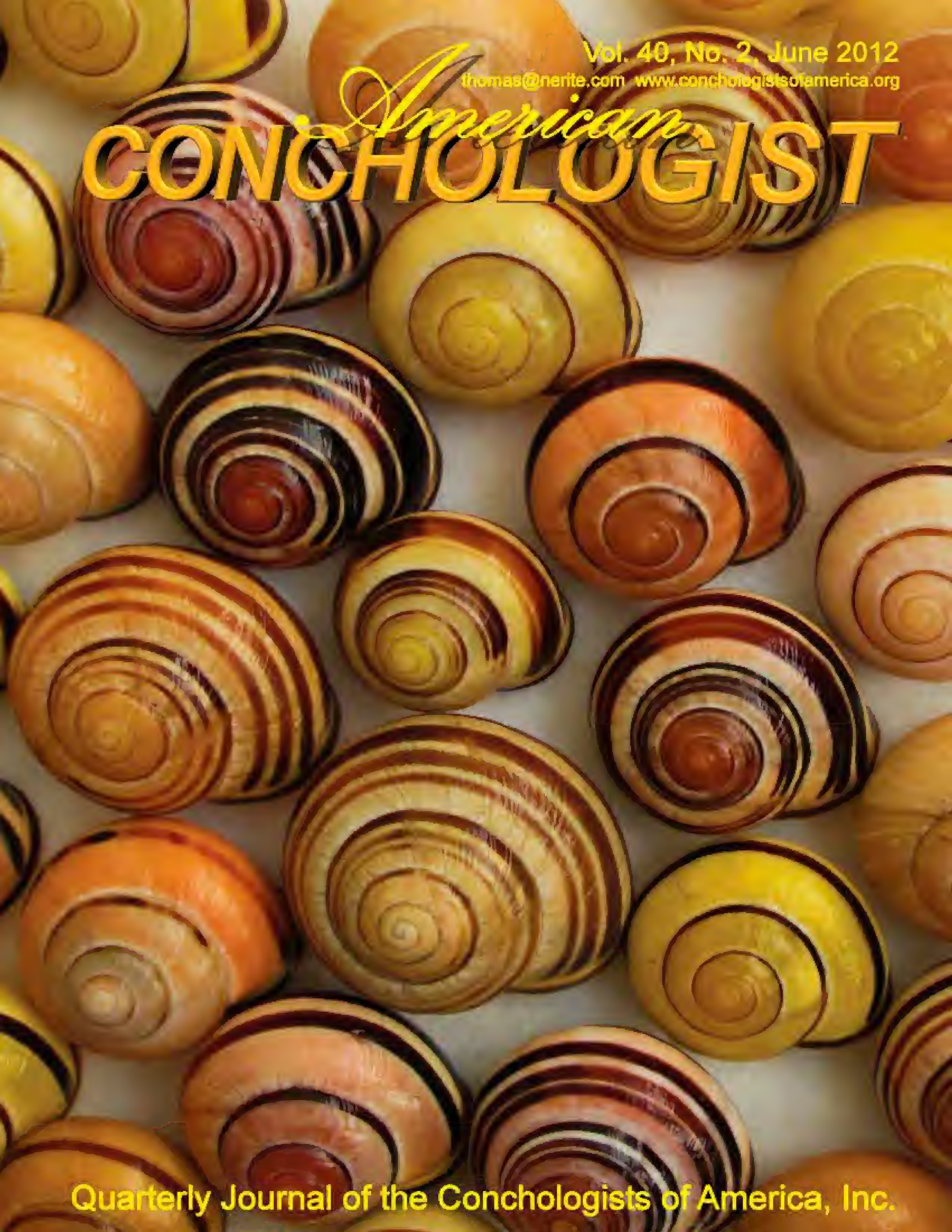

Quarterly Journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world. In 1995, COA adopted a conservation resolution: Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.

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Editor's comments: I received the following from Harry Lee:

"Dear Tom,

"I have been caught in a bald-faced inaccuracy (plus one of lesser import), and I think the record should be set straight.

"In the article on partulid snails, etc. in the last issue (Lee, H.G., 2012) I made an inexplicable and heinous misidentification. The gentleman with the "cadaverous countenance" in Fig. 4 (p. 11), is Andrew Garrett, not William Harper Pease as captioned. I owe thanks to Dr. Alan Kabat, who recalls the photograph from Harvard's Museum of Comparative Zoology, where that dour-appearing but kindred spirit looked upon him for many long hours. An additional error pertains to Fig. 8, in the caption of which I wrote: "Le Château be Balaine (sometimes rendered Baleine), home to the Adanson family, was completed in 1850 and now serves as an upscale country inn within a 20-hectare botanical garden in France." Dr. Danielle Callen, Historian of the Family, Arboretum de Balaine, has informed me that the construction of the château continued until about 1890, that it is not actually an inn, rather the residence Courteix-Adanson family, and that the surrounding land is better termed a botanical arboretum (as indicated elsewhere in the text). The only explanation for the disconnect is my heavy reliance on Internet resources; lesson learned.

"Lee, H.G., 2012. Partulid snails, their collectors, and a prodigious dynasty of French naturalists. American Conchologist 40(1): 10-19. March [April].

"Harry G. Lee"

Unfortunately, I have to follow this with acknowledgement of an error of my own. In the last issue, in Karen VanderVen's article on shelling in Honduras, I credited several photographs of living mollusks to "author." Karen was quick to point out that she DID NOT take those photos, but that they had been taken by Charles Rawlings. I should have recognized them as we have all seen his superb photos many times in this magazine. So apologies to both Karen and Charles.

Now please enjoy this issue. There should be something here for just about everybody.

Front Cover: *Cepaea nemoralis* (Linnaeus, 1758), a colorful European land snail that was introduced into the United States in 1857 by Dr. W. G. Binney a British Malacologist, who released the snail into his garden in New Jersey. Image by Nuimal Bahar of the United Kingdom.

Back Cover: A pearlized *Nautilus pompilius* Linnaeus, 1758, decorated with silver and turned into a vessel similar to those popular in Europe in the 18th Century. This shell was one of the spectacular shells displayed by Donald Dan at the St. Petersburg Shell Club shell show. Photo adapted from original by Randy Allamand.

Sinistral peanut snail and polygyrid update. Sequestered specimens, oversight, irony, and a failed strategy with a happy outcome

Harry G. Lee

Thanks to Jerry Harasewych, some other cooperative museum scientists, and two recent bits of conchological irony, I now I have two additional sinistral *Cerion* specimens, an expanded account of two reported earlier, an additional polygyrid species, and a short vignette on the discovery of the third specimen of a confamilial to add my recent account (Lee, 2011).

Left-handed *Cerion*

C. incanum **(A. Binney, 1851)**: USA: Florida: Monroe Co., Big Pine Key. On W side US 1. Collected by William J. Clench, 6 June 1956: MCZ [Museum of Comparative Zoology, Harvard University] 211263; one 22.2 mm sinistral specimen among 121 shells (personal communication, M.G. Harasewych, 2 Dec. 2011, and Adam Baldinger, 11 January 2012). Previously reported and figured in B&W without full collection data or catalogue no. (Gould *et. al*., 1985) **[Fig. 1]**.

C. incanum **(A. Binney, 1851)**: USA: Florida: Monroe Co., Big Pine Key. At SE corner of Old Beach Rd. and US 1 [T67S, R29/30N; ca. 15 mi. W Marathon], FL. Collected by William J. Clench, Margaret and Archie Jones, and Margaret Teskey, 6 August 1978, *ex* Clench: OSUM [Ohio State University Museum] 8189: one 19.1 mm sinistral specimen among 18 shells (pers. communication G.T. Watters, 6 December 2011). Previously reported and figured in B&W without full collection data or catalogue no. (Gould *et. al*., 1985). No MCZ material from this station seems to exist (MCZ Malacology Database).

C. lividum **(Maynard, 1924)** [= ***C. glans*** **(Küster, 1844)** *fide* Gould and Woodruff, 1986]: Nassau, Bahamas. Collected by Charles Johnson Maynard, summer 1924: United States National Museum [USNM] 420104: one 26.9 mm sinistral specimen among 200 paralectotypes. Maynard's fourth sinistral *Cerion* shell; mentioned but not figured in Harasewych *et al.* (2007: 520) **[Fig. 2]**.

C. tridentatum costellatum **Pilsbry, 1946**: USA: Florida: Palm Beach Co., Delray Beach. SR A1A just N of the public beach and S Crestwood Drive. Empty shells on sand behind dunes. Collected by Anne DuPont, 2 February 2011: one 32.3 mm sinistral specimen among 17 shells: H.G. Lee Collection **[Fig. 3]**. This outing constituted the first time Anne ever searched for land snails, let alone *Cerion*, let alone a sinistral specimen thereof. To say this situation included both a novitiate and a stroke of good fortune **hardly does justice to the improbability** of this event.

Present totals: 5 species and 14 specimens, only 5 individuals known to have collected 13 of them; the 14th (OSUM 8189; see above) seeming to have been the product of a collecting quartet's effort and its special significance apparently unrealized until Bill Kasson brought it to light a few years after the fact (Gould *et al.*, 1985).

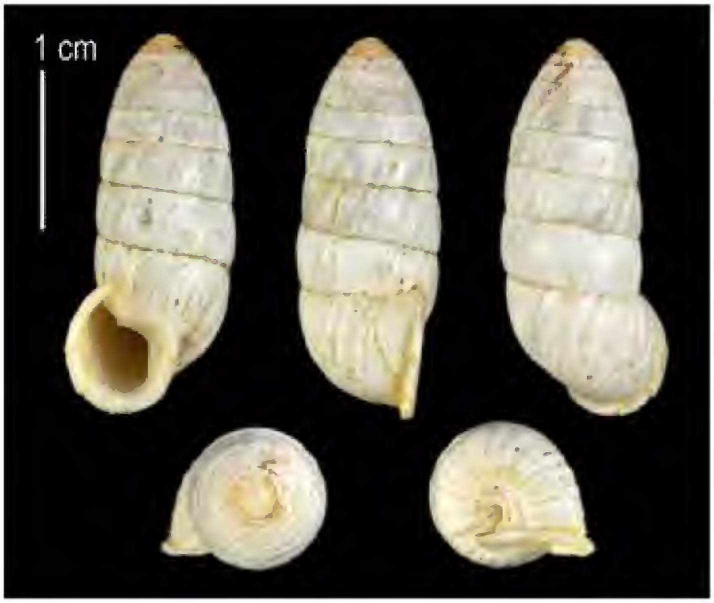
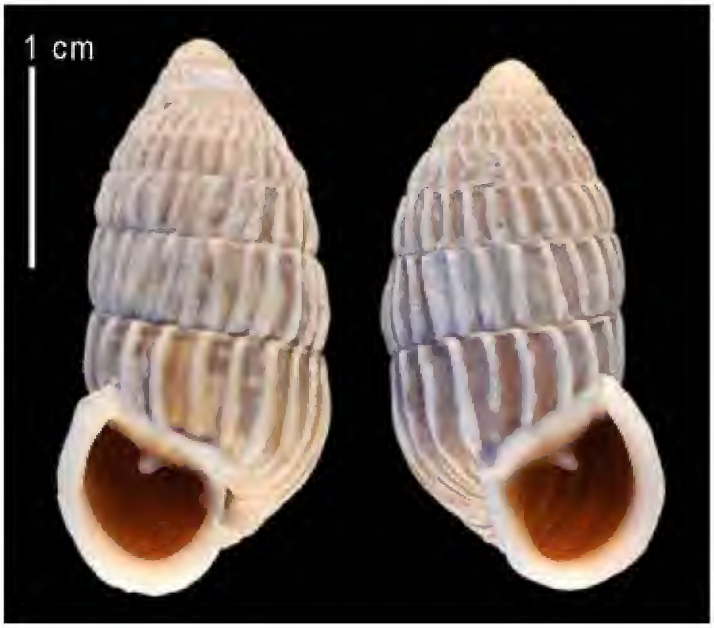


Fig. 1 (above) ***Cerion incanum*****, 22.2 mm, from Big Pine Key, Florida. Proving the value yet again of museum collections, this specimen was collected in 1956 but only 'rediscovered' as a sinistral specimen in 2011.**

Fig. 2 (below) ***Cerion lividum*****, 26.9 mm, from Nassau, Bahamas. The sinistral specimen on the left was collected in 1924 with some 200 dextral specimens.**



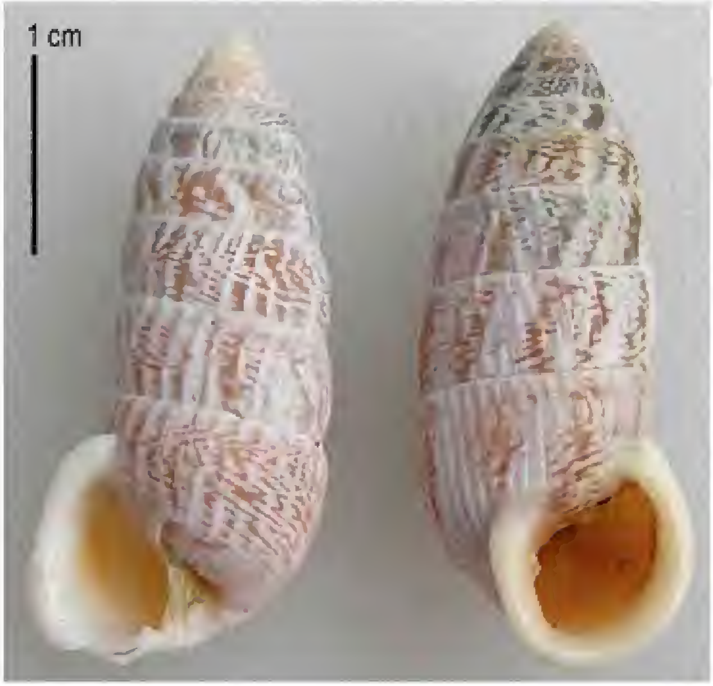


Fig. 3 ***Cerion tridentatum costellatum*, 32.3 mm, from Delray Beach, Palm Beach Co., Florida. The sinistral specimen on the left was collected by Anne DuPont along with 16 dextral specimens. The rarity of sinistral *Cerion* and the fact that this was Anne's first attempt at land snail collecting, make this find truly noteworthy.**

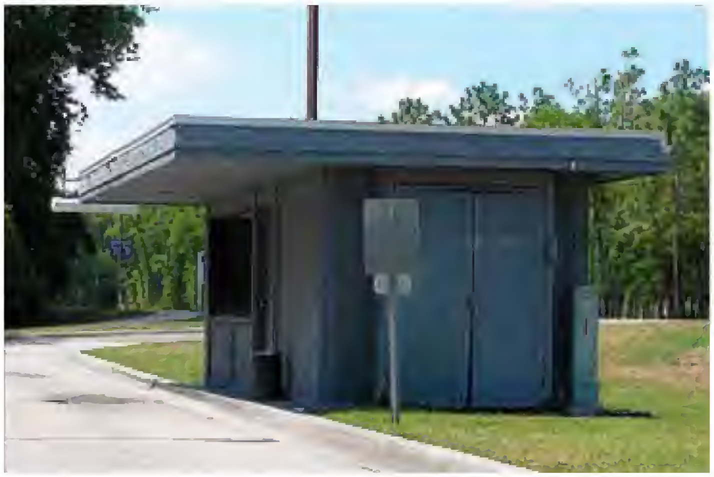
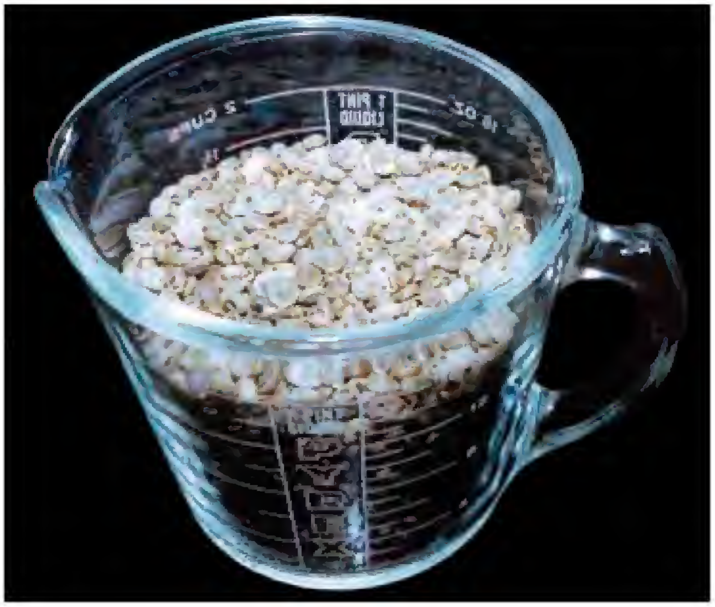


Fig. 4 (above) This building on the University of North Florida campus was covered with *Polygyra cereolus*. Bill Frank collected 14 oz. of *P. cereolus* from this building - approximately 3,885 specimens!

Fig. 5 (below) The result of Bill's collecting efforts, close to one pint of southern flatcoils, did not include a single sinistral specimen.

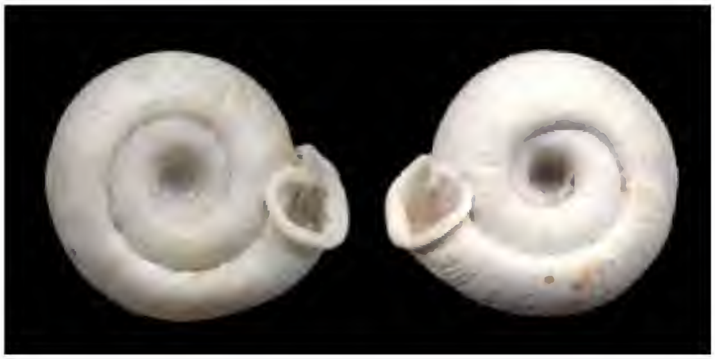


Sinistral polygyrids

There are also two addenda to the polygyrid portion of the topical report. I somehow overlooked a sinistral specimen of the Atlantic threetooth, ***Triodopsis juxtidens*** **(Pilsbry, 1894)**, collected and photographed alive by John Slapcinsky (now of the Florida Museum of Natural History, FLMNH) in juxtaposition with one of its six dextral lot mates and figured in Abbott (1989: 9). John tells me he found these snails the preceding year in Stanardsville, Greene Co., VA, in a meter-wide portion of a poison ivy-covered embankment alongside US 33 near the courthouse parking lot (38.2971ºN 78.4394ºW). He doesn't recall the exact date, but well remembers the *Toxicodendron* allergy that ensued [ed. note: poison ivy or sumac for our non-MD readers]. This is the first reported occurrence of a sinistral specimen of this species, the fifth species, and the tenth individual of its genus known in this condition. The lot of seven is now in the Field Museum of Natural History, Chicago (FMNH 311545).

One more polygyrid find warrants a short commentary. Most Florida shellers can attest to the abundance and ubiquity of the southern flatcoil, ***Polygyra cereolus*** **Mühlfeld, 1818**. Knowing that my late friend Wayne Sullivan had collected a live sinistral specimen (Lee, *loc. cit.*: 9) from a large sample, on April 23, 2006, I recruited one of Florida's most productive field collectors, Bill Frank, to exploit a large population of this species he'd found estivating on the side of a small building on the campus of the University of North Florida, almost coating it from foundation to eaves **[Fig. 4]**. Using a paint brush, dust pan, and a scrub bucket, he harvested about one pint of snails. I then examined the specimens: all were southern flatcoils, 30 percent juveniles (3-6 mm), the remainder 6-9 mm adults. The total volume of the sample was 14 oz., and, by weighing 100 shells, I was able to place the total number at about 3,885 specimens **[Fig. 5]**. Alas, not one sinistral specimen was in the lot of them, and, yes, they were released into the wild after their disappointing service to science.

Normally such an experiment with irreproducible or, as in this instance, negative, results doesn't gain much currency, so this little study was simply filed away at <http://www.jaxshells.org/galleryx04.htm>. Its ascent to newsworthiness enough to reach the pages of *American Conchologist* occurred five years later, July 27, 2011. To be exact, I noted a strange small white shell while walking along the shoulder of CR 207 just NW of the Deep Cr. bridge near Hastings, St. Johns Co., FL. Compelled to look more closely, as I have on thousands of previous roadside reconnaissances, I picked it up. You guessed it **[Fig. 6]**! Thus the



Although rare, sinistral *Polygyra cereolus* do exist, as the specimen on the right proves. This was was not found by examining thousands of specimens, but rather spotted as I walked along a Florida roadside. [ed. note: Dr. Harry Lee obviously has a well-developed and maybe even unique 'search engine' as I doubt many of us would have spotted this tiny shell, much less noted its sinistral structure.]

third reported instance of a sinistral southern flatcoil was actualized, not through a calculated protocol, but by a random encounter. Looking at the literature, one cannot help but be impressed by the fact that this is the way it is done! Thus the secrets to "beating the odds" are (1) keep your eyes peeled, (2) spend lots of time in the field, (3) be patient, don't force it, and (4) persevere, good fortune may well catch up in due course!

Acknowledgments: I thank Adam Baldinger, MCZ [MCZ], Jochen Gerber FMNH [FMNH], M.G. (Jerry) Harasewych, USNM [MCZ, USNM], John Slapcinsky, FLMNH [FMNH], and G.Thomas Watters OSUM [OSUM] for information on the discussed specimens, which came to their notice in the field and/or collections of the four bracketed collections. Figures 1 and 2 were provided by Jerry Harasewych. Nos. 3, 4, and 5 were created by Bill Frank (Jacksonville, FL), who also provided image editing services.

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Harry Lee
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Fie to you!

[or Φ 2 U]

This short note is to recommend a paper for your edification and amusement. It is Marjorie Fogan's Presidential Address, entitled *Mollusca in Fiction*, in the 1991 *Journal of Conchology*. There are numerous interesting and entertaining excerpts from, and descriptions of, various novels in which mollusks play a part. My favorite is from a short story by Lord Dunsany, *The Sign*.

It is difficult to improve on Fogan's succinctness, and much of this note will be quoted directly from her paper. The protagonist, named Hochner, believes in transmigration. He is "vain enough to anticipate his reincarnation in some very superior station – possibly as a king. He tells a younger friend that he has trained himself to remember in any circumstances a sign, the Greek letter *Phi*, and that he will be able to prove the truth of transmigration by making the sign." As he was talking to his friend, they were walking in a garden where Hochner steps on snails in the path "which cannot matter to such low forms of life." After Hochner's death, the friend anticipates some day seeing "some exalted person" making the sign, "but walking again in the garden he notices a snail upon the wall. Slowly it traces with its slime a perfect circle, then a vertical line intersecting it and forming the letter *Phi*."

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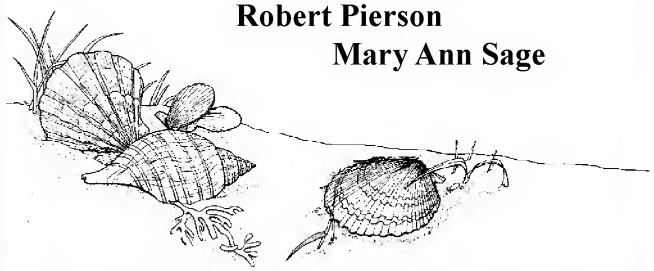
In memoriam:

Robert Pierson
Mary Ann Sage



A shell show primer

John Timmerman

The success of a shell show depends upon varied elements. Exhibitors and collectors gather to show off new shell-related finds, discuss scientific discoveries, and interact with one another. The visiting public is a valued and integral part of the show's success. As exhibitors we must remind ourselves that our general audience may know little about shells. A good show introduces shells in a language that speaks to all, not just the expert. To the experienced shell collector, a basic understanding of the process by which the animal makes a shell seems elementary. I meet people that know hermit crabs live in shells, know the crab does not make its shell, but do not know where the shell(s) come from.

Whether exploring a beach or backdoor garden, mollusks and their shells are often ubiquitous to the scene. Few people have walked a beach without coming across a shell that elicits questions. How many durable objects of inspired beauty and design can you think of that can be found lying on a beach with the following holding true - at no monetary cost?

It is there to be picked up.
You may enjoy it.
You may study it.
You may keep and treasure it.

"I found this" is a statement with which most people can identify that reflects the excitement of shell collecting. The unfettered conditions of the experience starts creative juices flowing. A shell show encourages and expands on this discovery.

To the uninitiated, a shell show may be a group of geeky people meeting to promote a subject in which few in the general population are interested. National and regional awards that promote accurate scientific study and presentation may not be understood. For shell people, the exhibitor who earns recognition for a job well done and the details of his or her winning exhibit are what is important. Significance of shell show awards is no less so than those earned within other disciplines by encouraging and recognizing excellence. The award paradigm is integral to a quality show and a successful connection to the public. Add the shell collectors themselves and the matrix for presenting this incredible study for all to understand is complete.

The North Carolina Shell Show is the place to go in southeastern North Carolina to see a shell show at its best. Nationally recognized shell collectors exhibit wonders of the natural world. Shell enthusiasts, amateur and professional alike, provide an endless font of knowledge and experiences with shells for all in attendance to enjoy. These beautiful objects and their animals inspire entrants to enter photographs and create works of art that help us see the subject in a new light. It is also the opportunity to get a few new shells from the vendors for your fireplace mantle or a growing shell cabinet. As an added plus, there is the ever-popular shell give away table. Whether purchasing or grabbing up a free shell, the stunning and endless variety of shells from around the world is amazing.

Above: FREE SEASHELLS! Susan Rotman assists visitors at the Shell Give-a-Way. Shells are displayed in trays where visitors can find the shell that most pleases their eye. The Shell Give-a-Way is part of the club's welcome center, including information on shows, conventions, membership, and ballots that can be cast for the "People's Choice Award."

Below: These shells are not free, but they form a key part of any shell show. Dealer displays and sale tables are fodder for collector's dreams.

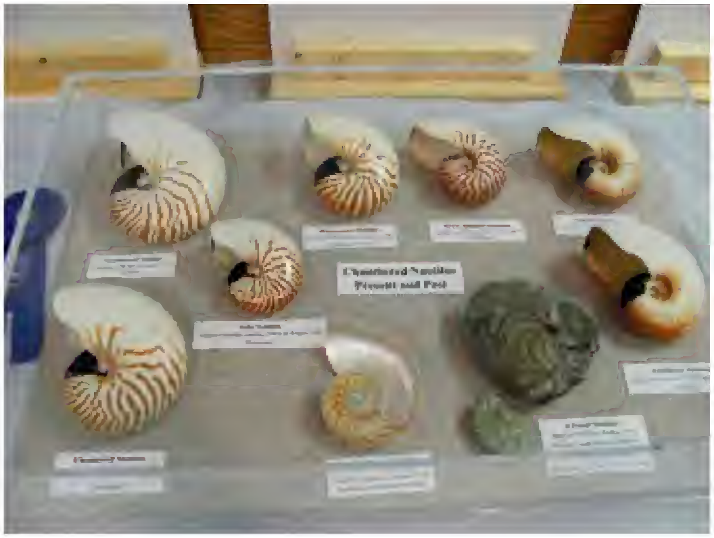
Frank Abramson, Ed Petuch, and Lyle Therriault examine a fossil *Ecphora* Dr. Petuch has just discovered at the Shell Give-a-Way. The *Ecphora* proved to be a species previously unknown from North Carolina deposits.

Above: Susan Ross and Bill Bennight staff the club's sales table. Such sales support a scholarship at University of North Carolina Wilmington (UNCW), sponsored by the North Carolina Shell Club.

Right: "Chambered Nautilus, Past and Present" displayed at the 2011 North Carolina Shell Show.

Left to right: Art Bogan, Sue Hobbs, Phil Dietz. Sue's display of shells for sale is a highlight of every show she attends, with high quality shells, beautifully displayed.

Susan O'Connor expands her shell collection aided by Bob Lipe, knowledgeable dealer and long-time COA supporter.



Above: Doug Wolfe and Betsy Bluethenthal discuss shell books. While critical to successful shell collecting such books, like a rare shell, can strain the budget.

Below: Ronald C. Hill holds his truly spectacular slit shell, *Entemnotrochus rumphii* (Schepman, 1879).

Left to right: Everett Long, John Timmerman, and Harold Brown have a quick meeting to discuss shell show business. Shell shows are the product of many dedicated people.

National and local organizations sponsor awards that promote excellence in shell shows. In 2012, to commemorate the 55th anniversary of the founding of North Carolina Shell Club, the North Carolina Shell Show will recognize the one exhibit that is superior in educational value to all others with the "Nan - Sea Education Award." The award is named for Nancy, wife of club member Everett Long, who has been an educator for 30+ years. Many of us founded our collections on the beauty of shells but inevitably asked questions. "What is it?" "What is its scientific name?" "What is its natural history?" If it weren't for scholars there would be no answers, even as basic as a name. The skilled collector researches the subject with the goal of expanding his or her knowledge of the kingdom of shells. The "Nan - Sea Award" emphasizes the importance of that goal; for without such knowledge we all would all be poorer. Educational excellence is arguably one of the most important tenets of all shell shows.

Whether you go to a shell show to learn about the shell you found on vacation or under a log in your backyard, or to expand an existing interest, or to be inspired and simply to hobnob with other shell collectors, the North Carolina Shell Show provides it all.

A few questions and statements generated by the hermit crab find:

"I can't believe something like a garden slug made the shell the crab uses! How does it know how to do that? Does it discard it to grow a larger one as it grows? Why is the shell colorful? Why does it have spines?"

We do not have answers to all of the questions a simple shell can elicit, but that is what makes this pursuit so enjoyable. With a shell show we open a door to questions and some answers, all based upon the wonderous nature of shells.

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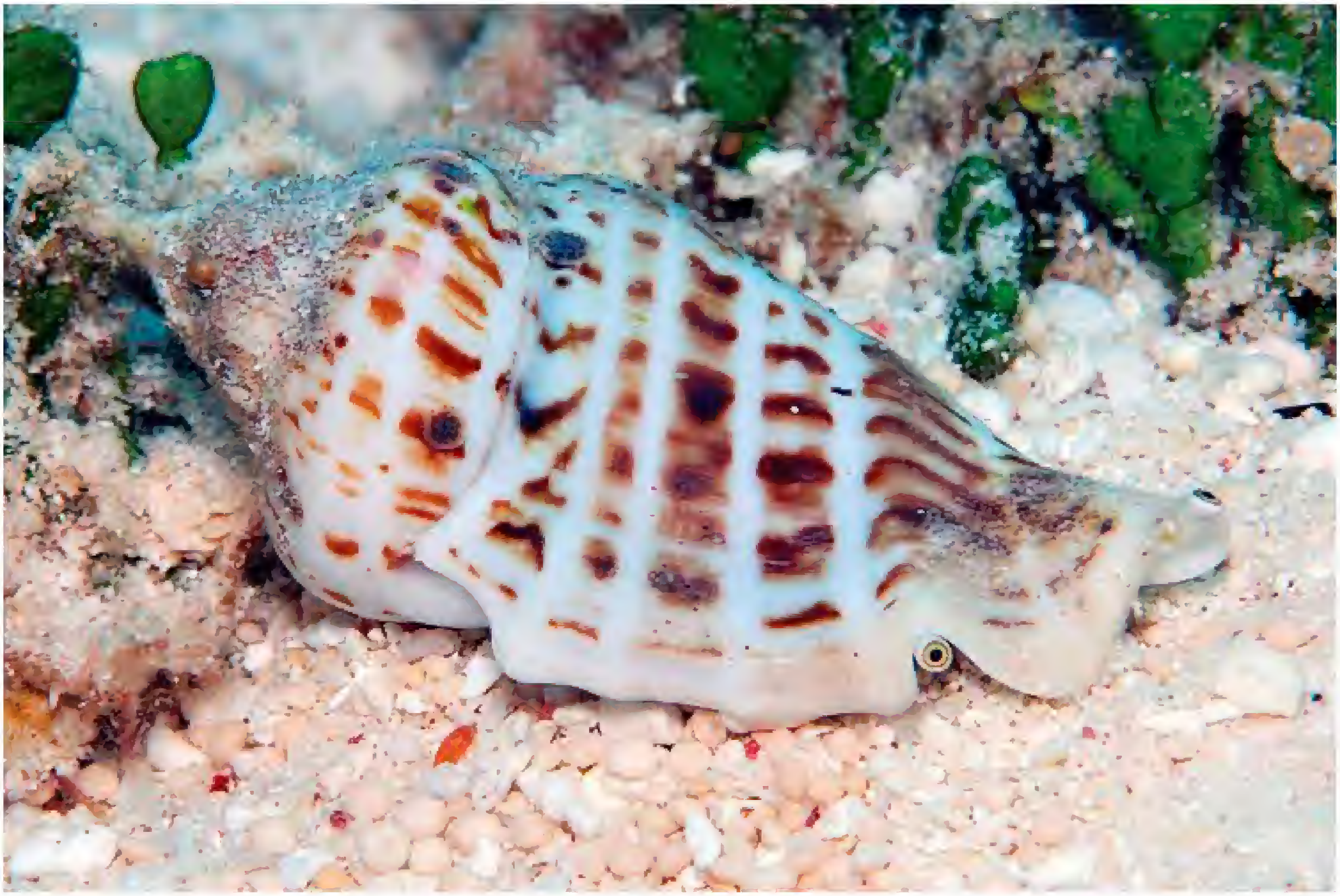
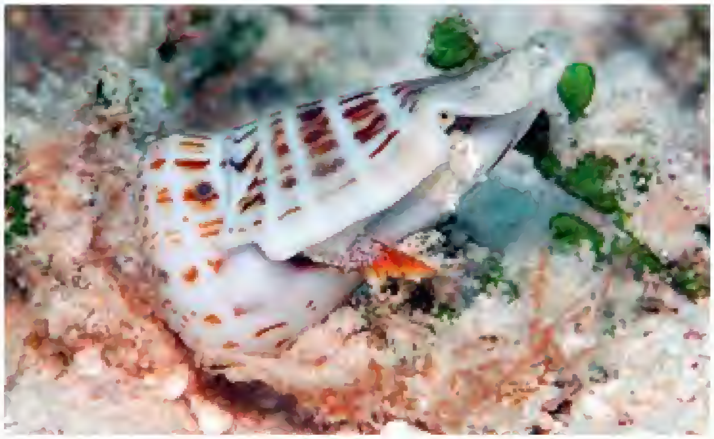
A report on *Gibberulus gibbosus* (Röding, 1798)

Scott & Jeanette Johnson

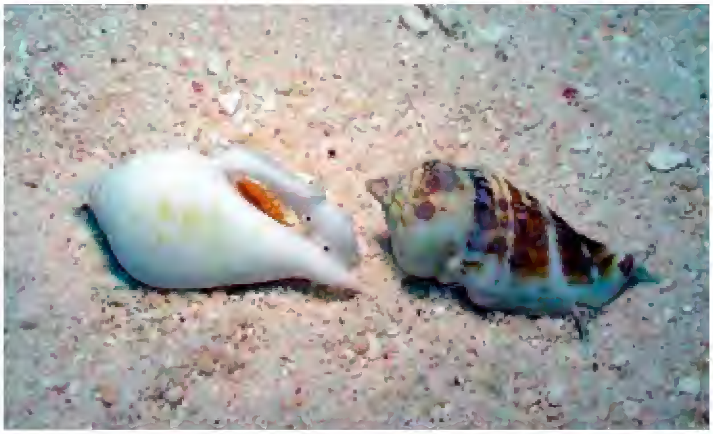


Gibberulus gibbosus (or as it is sometimes still known, *Strombus gibberulus gibbosus*) is abundant in many lagoon sand flats in the Marshall Islands. In some areas the hump-backed or hunchback conch seems to be the most common mollusk present. They are seen only rarely on the seaward reef. They range from about 1 to at least 20m depth and probably often extend deeper as well. The largest we know of was about 49mm long. Sometimes the shell is pure white, but it often is variably marked with brown and may have a purple or white aperture. Occasionally we see piles of shells that have been recently cleaned out by some predator without damaging the shell. We suspect some nocturnally active octopus is pulling the animals out of the shells and devouring them in large numbers.

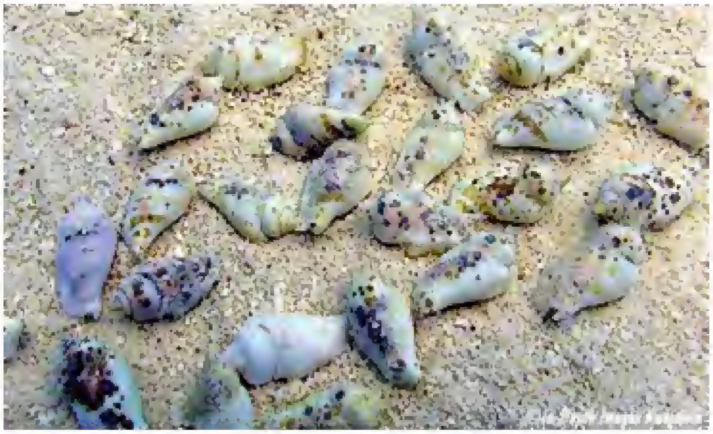
These small conchs can frequently be seen gathering on sand flats to breed, leaving their eggs in mixtures of sand and mucus on the top of the sand. We found the large group pictured here, marching (well, hopping) down a sandy lagoon slope all in the same direction. You can see the crowded front line toward the upper part of the last two photos on the next page, with their tracks in the sand trailing from the lower left. The front line extended a good 10 to 12m and there must have been thousands of the mollusks, all apparently of the same mind(?) about where to go.



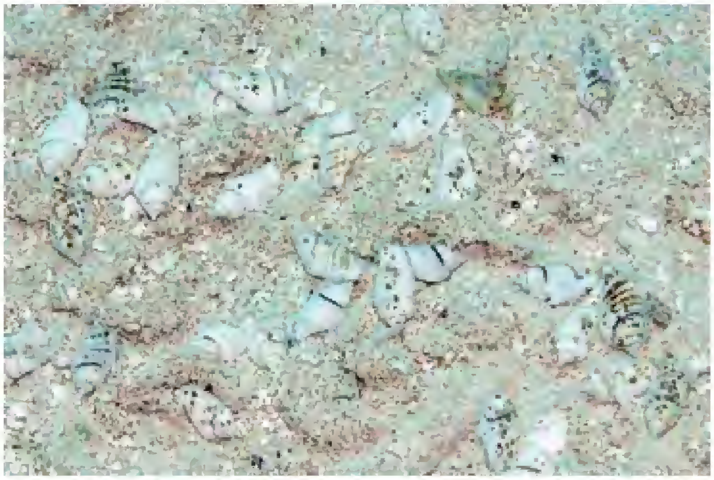
***Gibberulus gibbosus* (same individual as above) showing the eye placement within the 'stromboid notch' (right eye) and the siphonal canal (left eye) as well as the operculum. Strombs occur from shallow to fairly deep water and are most prevalent (number of species) in the tropics. They are herbivorous grazers, reproduce sexually, and lay thousands of eggs, apparently a successful life style as they are often one of the more commonly encountered species in a given environment.**



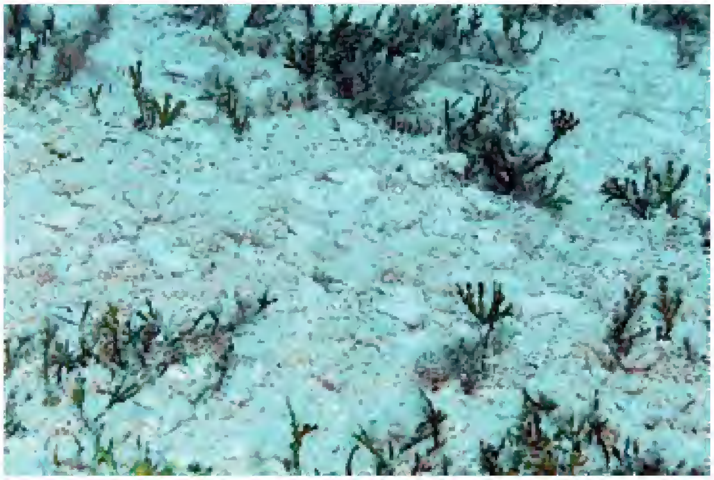
Dorsal and ventral views of living *Gibberulus gibbosus*.



***Gibberulus gibbosus* clustered on the substrate, apparently scraping off the algae they feed on from the surface.**

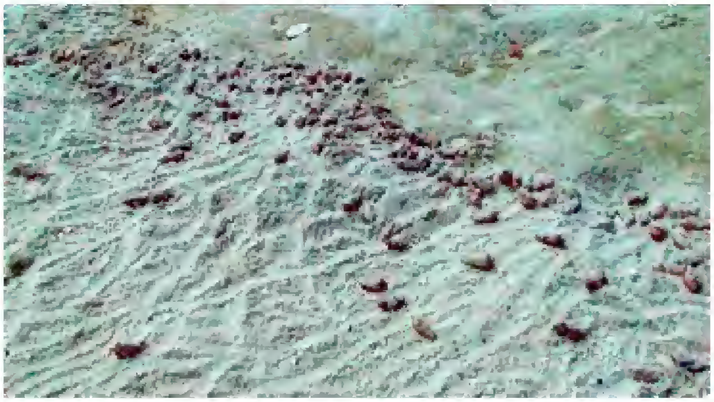


Both this image and the one to the right show feeding activity that involves digging under the substrate.



A cluster of *Gibberulus gibbosus* apparently feeding by digging into the substrate gravel.

The leading edge of the large group of strombs headed to the upper right in the photo and probably feeding as they go.



This image clearly shows the difference between the undisturbed substrate on the upper right and the channeled substrate the strombs have passed over and through.

Scott and Jeanette Johnson
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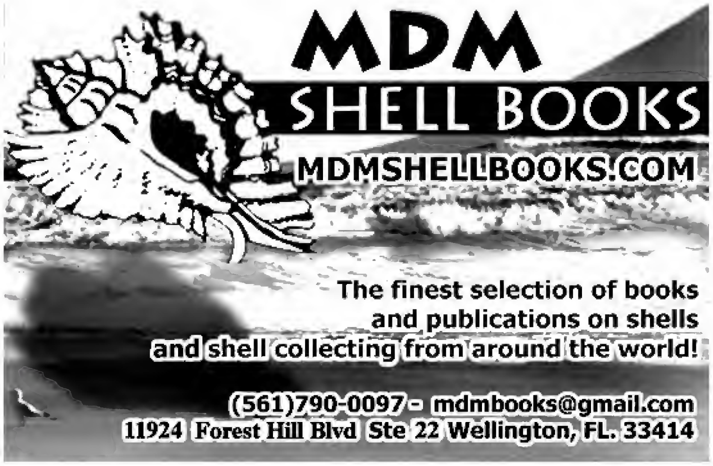
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Humboldt squid - cannibalistic killers or just jumbo mollusks? Diving amongst "killer" cephalopods - photographing the Humboldt squid

Charles Rawlings (photos by the author)

Fellow shell enthusiasts, sometimes an experience, a species, or an idea, while not specifically about shells, demands an article detailing the same. What follows is one of those instances. I recently had the opportunity to dive and photograph the "killer" cephalopod known as the Humboldt squid over the course of a week in the Sea of Cortez off Bahia de Los Angeles. What follows is a chronicle of my experiences accompanied by what is hopefully informative scientific observations as well as some heretofore never before photographed behavior.

As shellers and divers we rarely encounter any creature that could inflict a mortal bite, sting, or wound. In fact, very few animals in the ocean have actually caused a human death. When anyone mentions a dangerous sea creature, sharks immediately come to mind, along with those species of jellyfish that constitute the sea wasps or box jellies. Other dangerous species of which shellers and most ocean aficionados are aware include the cone shells and the blue-ringed octopus. Any number of well-known cone species have caused human deaths and the bite of the blue-ringed octopus kills in much the same manner. While these animals have lethal venom, only a very few sea creatures will actually eat a human. Such creatures include the oceanic white tip shark, the tiger shark, and the bull shark. As an aside, the great white shark really only tastes a human and doesn't eat him. Except for these sharks, no other sea creature actually will attempt to eat a human, save for one - *Dosidicus gigas* (d'Orbigny, 1835), the Humboldt squid - the subject of this article.

As most shellers are aware, the phylum Mollusca includes the typical seashells: gastropods, scaphopods, pelecypods, and cephalopods. Other classes, such as Aplacophora and Monoplacophora are not commonly encountered. The gastropods are the single-shell snails (for the most part), the scaphopods are the tusk-shells, while the pelecypods are the bivalves. Upon further division, the cephalopods include the *Nautilus*, the octopodes, the cuttles, and the squid. The *Nautilus* is a well known cephalopod with an external shell (**Photograph 1**), while the octopi (**Photograph 2**) have no shell at all (except the *Argonauta*). The cuttlefish (**Photograph 3**) and squid (**Photograph 4**) both have 'cartilaginous' inner support structures known in the cuttles as the cuttlebone; while in squids the inner support piece is flimsy and pliable and is sometimes called the 'pen.' The "killer" squid or Humboldt squid belongs to this group of mollusks, the cephalopods, which are also known as "head-footed." This mollusk, this cephalopod, this "killer" squid, was the object of our expedition.

My quest began several weeks before my actual travel with an e-mail explaining that the 'large' Humboldt squid were not in their usual habitat off the coast of Santa Rosalia, but were actually being identified several hundred miles north off the coast of Bahia de Los Angeles. How did we know? In the Sea of Cortez, August is squid fishing time and the Humboldt are prime targets,

1. (above): *Nautilus belauensis* Saunders, 1981 (the Palau nautilis), photographed in 80' of water, trapped in 1500' of water, Palau.

2. (below): *Octopus briareus* Robson, 1929 (Caribbean reef octopus), photographed hunting in 20' of water, U.S. Virgin Islands.

3. (above): ***Metasepia pfefferi*** **(Hoyle, 1885) (flamboyant cuttle), photographed in 40' of water, Sulawesi, Indonesia.**

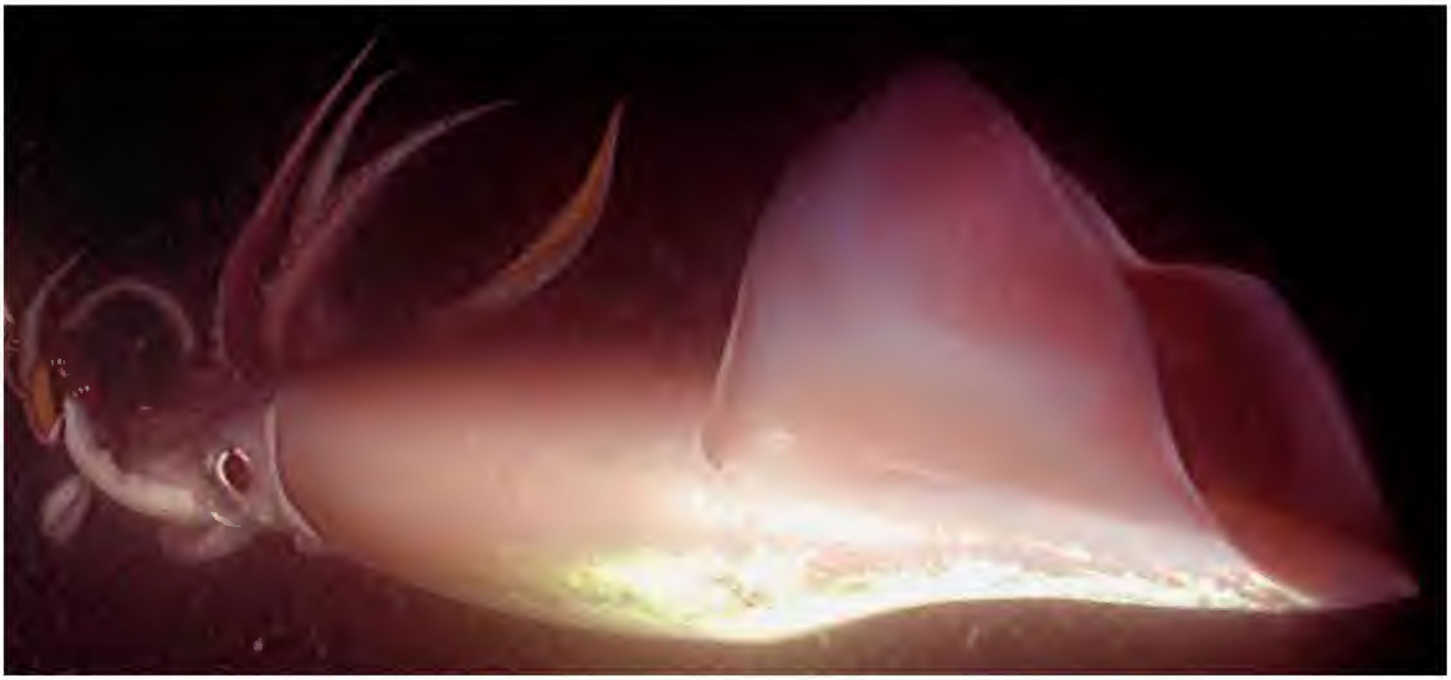
4. (below): ***Sepioteuthis sepioidea*** **(Blainville, 1823) (reef squid), photographed in 50' of water, Roatan, Honduras.**

some measuring 8 feet in length and weighing up to 200 pounds. Oh, the small ones were being caught off Santa Rosalia (2-3 feet in length), but the big ones, they were further north. As a result, the travel time on our dive boat was increased by a day and a half both ways, while our dive time was diminished by two nights. With that knowledge I boarded the plane to Cabo. After landing I took a car to La Paz, where I was to meet the boat. At least we knew where prime squid habitat was to be found, off Bahia de Los Angeles.

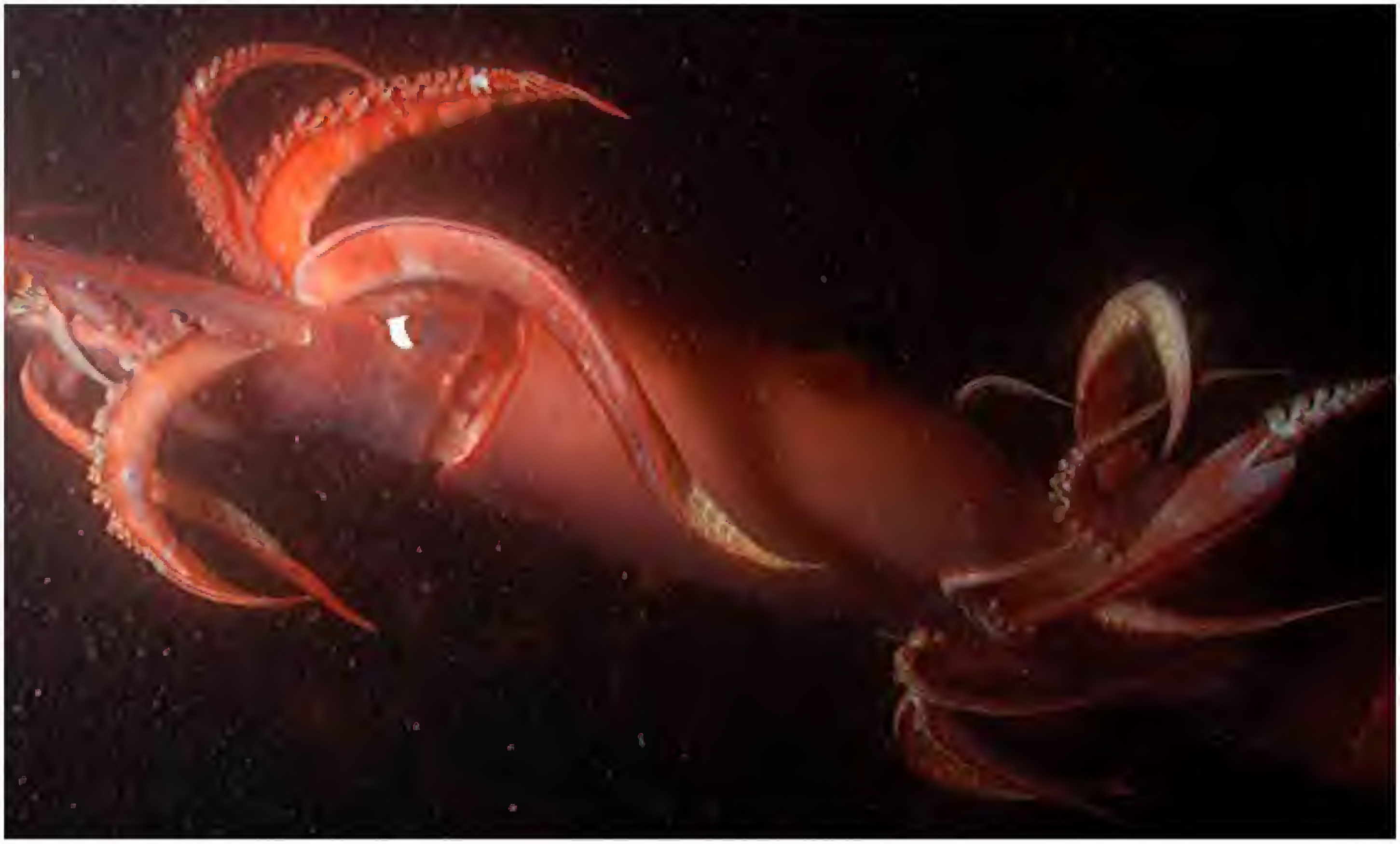
After arriving in La Paz during a driving rainstorm (yes, it does rain in Baja) I was able to board the dive boat at about 2 pm. The boat's name is *The Sandman* and it is owned and skippered by Captain Ron Steele. Captain Ron is a legend with anyone who knows anything about Humboldt squid. He has captained *The Sandman* for any number of squid expeditions, including the BBC and National Geographic, plus fishing for squid himself. If he couldn't put us in the water for squid photographs - no one could. The boat is a beautiful synthesis of form and function. The dive deck is spacious and easy to use while the sleeping quarters are large and comfortable. They needed to be as we would be steaming from La Paz to Bahia de Los Angeles for two and a half days with stops only for fuel. At 6 pm we left the dock, entered the Sea of Cortez, and began our steam northward. The seas were calm, the sunset was an amazingly intense amalgamation of red, orange, and purple, and the air was balmy. Our first night we were accompanied by pods of dolphins as well as several humpback whales. Captain Ron kept the bow pointed north, with Baja on our left and the Sea of Cortez on our right. In the ocean we spotted sailfish, whales, dolphins, and mola mola; on the land, there was absolutely no sign of human habitation, the rock and geological formation were of mind boggling proportions, and cacti grew rampant. Each night the sunset was more magnificent than the first. On the evening we turned the corner into the vicinity of Bahia de Los Angeles we noticed small two-person pangas with small lights; we had found the home of the killer squid and the fishermen. Our first attempts at diving with the squid, however, were a nightmare.

Before you read about our diving exploits, let's examine what is known or at least hypothesized about Humboldt squid. The Humboldt squid, also known as the jumbo squid as well as diablos rojos, the red devils, by the fishermen in the Sea of Cortez, take their name from the cold water current known as the Humboldt where they live. Their reputation as a killer squid is the basis for their name diablos rojos, at least among the squid fishermen. These squid are large, can reach up to 8 feet in length, and weigh between 100 and 200 pounds. They are deep-water dwellers during the day, living at depths of between 500 and 2000 feet. At night they ascend all the way to the surface to hunt. Their distribution ranges from Tierra del Fuego north to at least northern California. In fact, recent reports have them ranging even further north to Alaska. In addition, they live in the Sea of Cortez, most commonly off Santa Rosalia, and now it seems the large ones had migrated north off the coast of Bahia de Los Angeles.

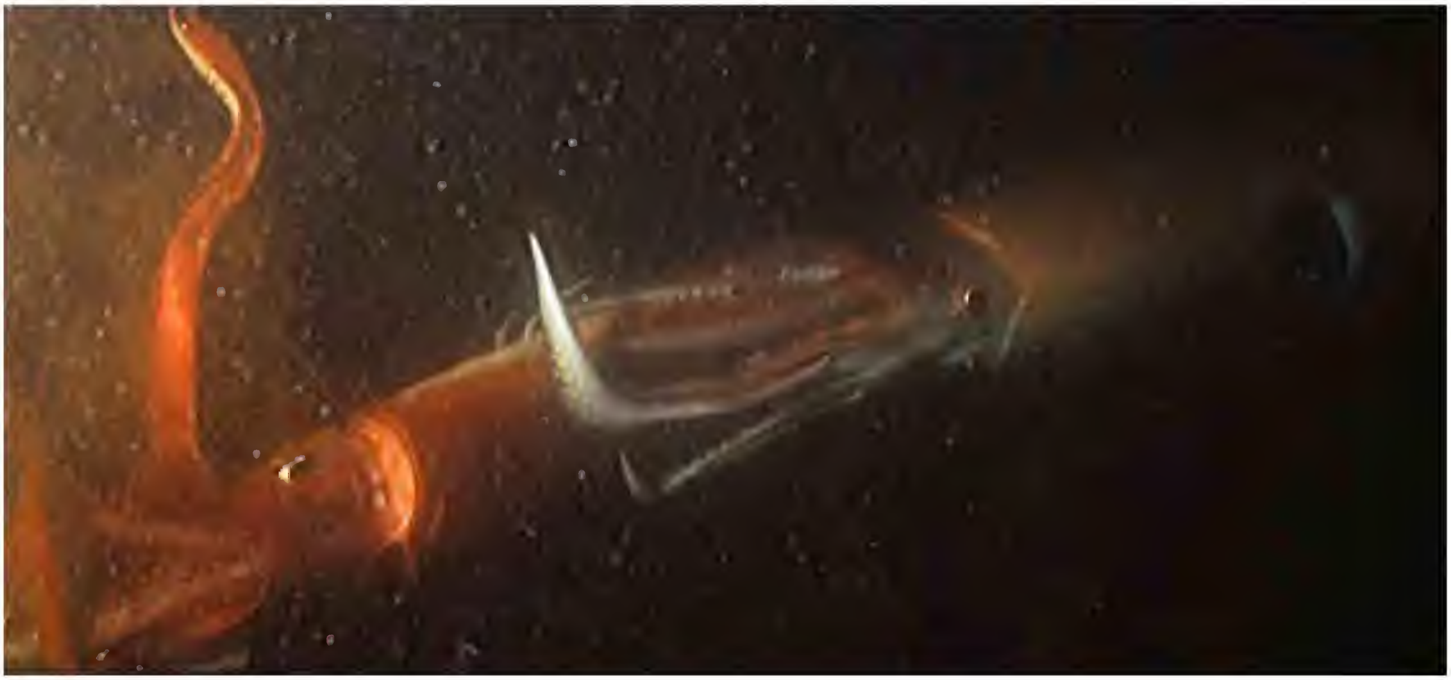
These squid are typical cephalopods in some ways but have several unusual characteristics. As is typical with squids, the Humboldt can change colors rapidly. In fact, they are able to flash a series of colors ranging from pale white to brilliant red due to the presence of and control over numerous chromatophores (**Photographs 5 and 6**). These squid are also able to eject a large ink cloud when disturbed (**Photograph 7**). Unique characteristics include barbed suckers on their feeding tentacles as well as their other arms, plus the presence of a large, almost baseball size, chitonous beak. The barbs surround all the suckers and can hook into flesh as well as wet suits. When these suckers peel off it sounds like Velcro underwater. As for the beak, unofficial studies put the force generated by the squid at about 1200 psi. With its razorblade sharpness and these generated pressures, the squid shreds its prey to bite-sized chunks in minutes. These squid hunt aggressively in schools numbering up to 1000 individuals. They will attack and eat most sea life but their favorite prey include: lantern fish, shrimp, and other squid. They have also been known to exhibit cannibalism. Moreover, they have been known to attack humans with one of the most famous instances captured on film by Howard Hall and Bob Cranston. Almost nothing is known about their reproduction and their eggs have never been observed. Finally, when caught, Humboldt squid are vicious and there are reports of fishermen being dragged over the side of their pangas, never to be seen again. What was it like diving and trying to photograph them? As I alluded to earlier, our first night in the water with the squid was complete mayhem.



5. Humboldt squid, normal grey-white phase, photographed in 50’ of water, Sea of Cortez.



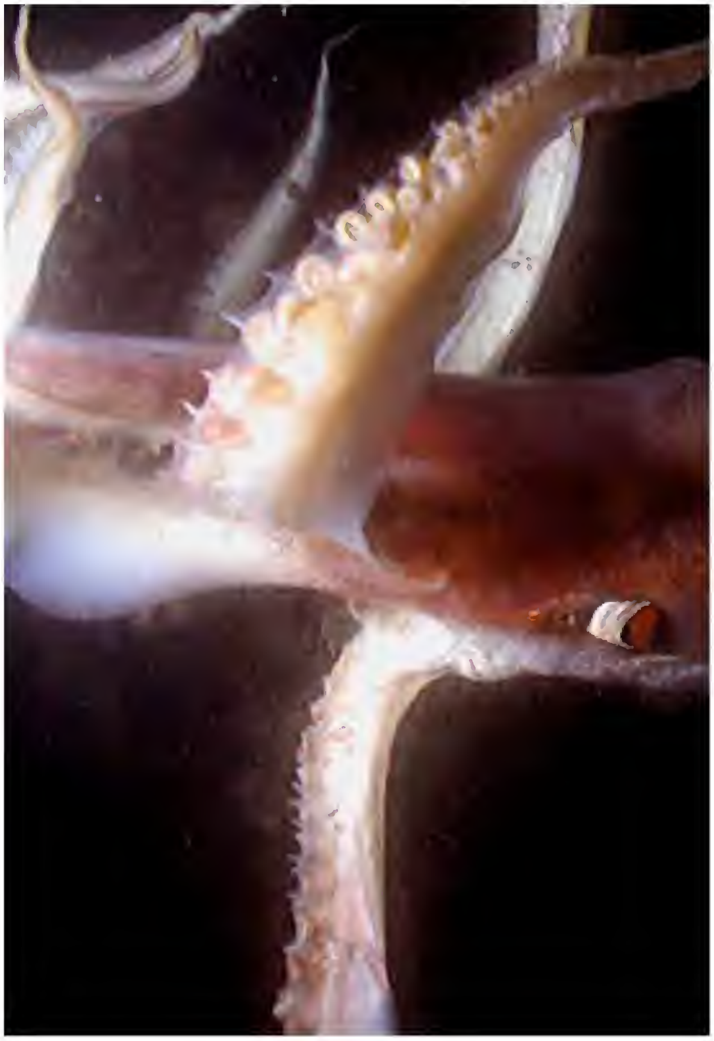
6. Humboldt squid, red phase, just coming under attack, photographed in 30’ of water, Sea of Cortez.



7. (above): Humboldt squid under attack releasing an ink cloud, photographed in 50’ of water, Sea of Cortez.

8. (below, left): Panga fisherman with a small Humboldt squid caught on luminescent lure in 700’ of water, Sea of Cortez.

9. (below, right): Close-up of the suckers showing the encircling barbs.



During our days at sea, the group conceived of a plan where everyone would have an opportunity to dive and photograph the squid. We would put down a bait cage at 50 feet and have two crew members "fishing" for the squid with large luminescent lures to bring the squid close to the boat. A pair of divers would be at the bait while another pair would wait around the boat for any squid lured by the "fishermen." We would always dive in pairs for protection and would rotate the 3 pairs every 30 minutes; or so went the plan! We arrived at the squid's habitat offshore of Bahia de Los Angeles at around 5 pm, accompanied by the squid fishermen in their pangas. With them around we knew we were in the correct location for squid and almost immediately caught an intermediate-sized-one about 5 feet in length weighing 80 or so pounds from 800 feet of water. (**Photograph 8**) The squid were coming. Everyone got suited up, the sun set, the night grew dark, as did the water, and the teams went into the water, one at the bait cage, the other at 30 feet under the boat. Then the squid arrived. They were everywhere. Flying past the divers so fast they were just blurs and slamming into the divers from all sides and quickly emptying the bait box. What we hadn't planned for in advance was the poor water clarity and the squids' speed. Visibility was maybe 15 feet at best, unlike the 50 to 60 feet off of Santa Rosalia. The water was pitch black and our lights penetrated weakly if at all. The squid would retreat and hit again. Same with the bait cage - the squid would fly past, stop, take the bait, and leave, all before any photographs could be taken. After 2 hours and essentially no photographs being obtained, we admitted defeat and climbed back aboard the boat. We needed a new plan.

Over the next 24 hours, we conceived of a new plan. We would still have the bait box if any diver wanted to wait there, but we would use more "fishermen" to lure the squid to the boat. In fact, our intention was to hook a squid, and then release him for photographs. Two teams of divers would be on either side of the boat with the "fishermen" while one could be waiting or at the bait box. Armed with this new plan we set out the following night, arriving at the same location; the pangas were there as well. The plan should have worked, at least in theory. The problem was the weather; it had changed as a front blew through. A heretofore unnoticed current was running and the wind was howling, pushing the boat along and raising 5 to 8 foot waves. Still the squid came. One panga that night caught almost a ton of squid. We did nearly as well. Not a ton, but several that we released and were able to photograph, even with the seas, the current, and the drifting boat. What amazed us, however, was the incredibly vicious nature of the squid. They were clearly cannibals and a hooked squid was torn apart in a matter of minutes. We left expecting the following night to be "the one" for photos. No one was disappointed.

Our last night was clear and almost windless. The moon rose and with it a mild current. The pangas were out and again the squid were everywhere. I concentrated on photographing the cannibalistic behavior as well as obtaining close-ups of their eyes and tentacles. What I observed was truly mind boggling. Any squid that was hooked or even latched onto a lure was immediately attacked by a larger squid. The attacking squid wrapped all its tentacles around the hapless prey and began tearing it to pieces. From about 50 feet to the surface the prey squid was torn in half or eaten in its entirety. The color changes were phenomenal - flashing from red to pink to yellow to white as it died. Close-up photographs revealed the huge eyes and the suckers surrounded by the hooked barbs. In other photographs the marks left by these barbed suckers are clearly visible. While other divers were photographing individual squids, I was able to document the true savagery of the Humboldt squid as demonstrated by their cannibalistic nature. No squid survived to the surface once hooked! (**Photograph 9**) That was our final night and we left soon thereafter to begin our long steam south back to La Paz.

So what did the expedition learn about the Humboldts? It seems the population in the Sea of Cortez has moved north just as its brethren off the coast of California. They are incredibly fast and will indeed physically contact divers in the water. No diver was harmed and no one felt in immediate danger, but after the first night two of our team never went back into the water. These squid are feeding machines. Their tentacles are lined with suckers that are encircled by sharp hooks designed to catch flesh. The marks of these hooks are all too apparent on the squids' prey. Their beaks can tear flesh at will and could easily rip through a human's thin skin. They are savagely cannibalistic. If hooked or injured, the prey squid was remorselessly attacked and eaten by larger squid. Once injured or immobilized the hapless squid was dead in a matter of minutes. Finally, they can and do flash colors ranging from red to purple to yellow to white. These colors show up well in photographs. Is this a form of communication? For me that is unclear, but red was common when a squid was attacked.

In conclusion, as we steamed back to La Paz, in between the encounters with sperm whales, sailfish, and dolphins, after being mesmerized by the stark beauty and desolation of Baja and enchanted by the blazing, ephemorality of the sunsets, we realized that we had been diving amongst the "killer" squid, the stuff of legends, the Humboldt squid. We had seen their flashing colors, graceful speed, and savage nature all epitomized by their cannibalistic action. We had seen their beaks and hooked suckers in action. We had dived with the amazing Humboldt squid. Who knew a mollusk could eat you?

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Additional sources on the Humboldt squid:

Smithsonian National Zoological Park online at: http://nationalzoo.si.edu/Animals/Invertebrates/Facts/cephalopods/FactSheets/Humboldtsquid.cfm

National Geographic online at: http://news.nationalgeographic.com/news/ (search for Humboldt squid)

Humboldt squid online at: http://squid-world.com/humboldt-squid.html

Alien invaders: *Haminoea japonica* in North America and Europe

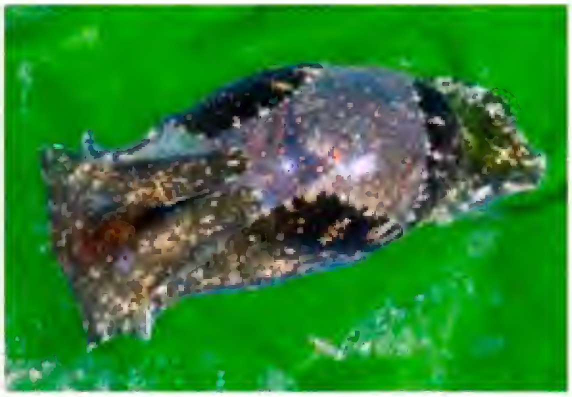
Dieta Hanson

Haminoea japonica Pilsbry, 1895, is a small yellow brown opisthobranch (sea slug), also known as the Japanese paper bubble snail, that was first described based on shell morphology by Pilsbry in 1895 as a variety of *H. binotata* (Pilsbry, 1895). In 1952, a more reliable description based on radular morphology was published by Habe. Starting in the 1980s, the species has been reported from South Korea, Washington State, Northern California, British Columbia in Canada, Italy, Spain, and France. *H. japonica* appears to have a negative impact on the native *Haminoea* species in the US (*Haminoea vesicula* (Gould, 1855)), and populations have decreased significantly in areas where *H. japonica* has flourished. *H. japonica* also has been found to carry a non-native parasite that has caused swimmer's itch in humans exposed to seawater in San Francisco Bay.

For my master's thesis, I wanted to answer two questions. First, is *H. japonica* really native to Japan? Since the first verifiable description was published shortly after the major expansion of Japanese forces during WWII, it is possible that the slug had been brought to Japan accidentally in ship ballast water or other means from other areas of Asia. Second, if it did come from Japan, specifically where in Japan? This may help us answer how the slug was transported to North America and Europe; if it was through ship ballast, we would expect that they probably came from an area with high shipping traffic, such as Tokyo or Hiroshima. Alternatively, if it came from an area with low shipping traffic but high oyster production, transport with oyster spat (seed) is the most likely mechanism, as proposed by Terry Gosliner and David Behrens in their 2006 paper published in the Proceedings of the California Academy of Sciences.

To answer these questions, I looked at the DNA of *H. japonica* specimens from their entire range - Japan, North America, and Europe - to see how much variety in the DNA there was in these different locations and to "match" DNA types, much like DNA is used in humans to identify close relatives. Through the generosity of the Conchologists of America and other sponsors, I was able to travel to Japan and Washington State in the summer of 2011 to collect material. Because of the earthquake and tsunami four months earlier, a large part of the north-east coast of Japan was not sampled, but Japanese colleagues were able to supply me with specimens collected before the disaster. Specimens from Europe were borrowed from museums or collected by colleagues.

When looking at the DNA in a gene called CO1, I found that there were very high levels of genetic (DNA) diversity in Japan that were also highly structured in association with the different ocean currents that surround the islands. For example, individuals collected from different locations in the Sea of Japan were more closely related to one another than they were to individuals from Tokyo Bay. This structure and diversity answered my first question; *H. japonica* was definitely a native species in Japan, although that does not preclude other regions in Asia from also being within the range of the species. Malacologists in China and Russia have said they have not found the slug in their respective countries, but thorough surveys are needed to confirm this.



A living *Haminoea japonica* showing the color of the animal around what is basically a yellowish white transparent shell. Photo by Angel Valdés.

In the invasive range, North America and Europe, all individuals were very closely related, with very low genetic diversity and structure. Furthermore, they were also closely related (exact match in the CO1 gene) to individuals from the northeastern Japanese prefectures of Miyagi, Fukushima, and Ibaraki. This region of Japan does not have any major international shipping ports, but is of major importance in historical and modern oyster export. The first oysters brought to North America from Japan were from this region. All other *H. japonica* from Japan (south, west, and north coasts) were very distantly related to those in the invasive range. This evidence, taken with historical data on oyster transport between Japan, North America, and Europe, supports the hypothesis that *H. japonica* was transported to its invasive range through exports of oyster spat from northeastern Japan, in answer to my second question.

Since oyster spat is still transported all over the world, including between European countries, Washington state, California, Oregon, Canada, and Hawaii, there is a very real possibility that *H. japonica* could spread even further to places where it is not currently found, such as Southern California. If slugs carrying the swimmer's itch-causing parasite were transported to Southern California and flourished, it would be disastrous for the local beach-tourism economy, in addition to the effects on local native species. The results of this study, therefore, provide important data for the development of policies and regulations aimed to prevent further spread of this species.

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A new land snail discovered in New Mexico (USA)

Tom Eichhorst

"What can New Mexico offer a shell collector?" When my wife and I returned to New Mexico in 1994, after 25 years in the US Air Force, I would have answered that question, "Not much." I was aware of a few introduced species: *Cornu aspersum* (Müller, 1774) (the common brown garden snail often listed as *Helix aspersa*) (Fig. 1) probably introduced in the early 1940s on rose plants imported from California by the New Mexico Rose Society, or several snails found in ornamental ponds that have not yet gained a foothold in our local water ways despite being commonly found at pet shops and pond suppliers. Species such as *Planorbarius corneus* (Linnaeus, 1758), the ramshorn snail (Fig. 2), or *Radix peregra* (Müller, 1774) (previously known as *Lymnaea peregra*), the wandering pond snail (Fig. 3), were what I expected to find in our local streams and ponds.

What I found instead was a plethora of small freshwater gastropods that were often indigenous to just a couple of springs and were listed as threatened or endangered by the state and sometimes the federal government as well. NO COLLECTING. I also discovered there is an endangered freshwater mussel in the state, *Popenaias popeii* (Lea, 1857), the Texas hornshell (Fig. 4). This came as quite a surprise as the only bivalve I had seen in New Mexican waters previously was *Corbicula fluminea* (Müller, 1774), the Asian or golden clam (Fig. 5), an almost worldwide invasive species. Like most other freshwater mussels, habitat destruction was the key factor in the endangered status of *Popenaias popeii* in New Mexico (Carman, 2007). Some of our small freshwater snails, like *Assiminea pecos* Taylor, 1987 (Fig. 6), are threatened or endangered simply because they inhabit isolated gypsum springs, seeps, and associated wetlands. Often a particular species is found in just one or two freshwater springs or spring-fed ponds. One ecological mess, such as someone dumping chemicals into an isolated pond, can wipe out an entire species. Of equally immediate concern is ground water pumping to water a dry state. Such pumping can and has caused water sources to go dry, often at the expense of a small molluscan species. In 1997, "Land Snails of New Mexico" was published and I found I could add 114 species of land snail to my New Mexico list of shelled mollusks.

In 2006 a list of "Threatened and Endangered Species of New Mexico," was published by the New Mexico Department of Game and Fish (http://www.wildlife.state.nm.us/conservation/threatened_endangered_species/documents/06BiennialReview_000.pdf. It lists the following molluscan species as threatened or endangered in the state (as defined by the NM Department of Game and Fish, an "endangered" species is one that is in danger of extinction whereas a "threatened" species is one likely to become endangered):

***Ashmunella hebardi* Pilsbry and Vanatta, 1923,** Hacheta Grande woodlandsnail (threatened)
***Ashmunella macromphala* Vagvolgyi, 1974,** Cooke's Peak woodlandsnail (threatened)
***Assiminea pecos* Taylor, 1987,** Pecos snail (endangered)
***Gastrocopta dalliana dalliana* (Sterki, 1898,** New Mexico shortneck snaggletooth (threatened)
***Utterbackia imbecillis* (Say 1829),** paper pondsnail (endangered)
***Popenaias popeii* Lea, 1857,** Texas hornshell (endangered)
***Oreohelix pilsbryi* Ferriss, 1917,** Mineral Creek Mountainsnail (threatened)
***Oreohelix forida* Pilsbry, 1939,** Florida Mountainsnail (endangered)
***Musculium partumeium* (Say, 1822),** swamp fingernail clam (threatened)
***Pisidium lilljeborgi* Esmark & Hoyer, 1886,** Lilljeborg's peaclam (threatened)
***Musculium lacustre* (Müller, 1774),** lake fingernail clam (threatened)
***Pisidium sanguinichristi* Taylor, 1987,** Sangre de Cristo peaclam (threatened)
***Musculium transversum* (Say, 1829),** long fingernail clam (threatened)
***Pyrgulopsis thermalis* Taylor, 1987,** New Mexico hot spring snail (threatened)
***Stagnicola caperata* (Say, 1829),** wrinkled marshsnail (endangered)
***Gyraulus crista* (Linnaeus, 1758),** star gyro snail (threatened)
***Pseudotryonia alamosae* (Taylor, 1987),** Alamosa springsnail (Federally endangered) (Hydrobiidae) fed protected since 1991, endemic to Socorro County, a couple of hot springs at the headwaters of the Alamosa River
***Pyrgulopsis chupaderae* (Taylor, 1987),** Chupadera springsnail (endangered)
***Pyrgulopsis gilae* (Taylor, 1987),** Gila springsnail (threatened)
***Juturnia kosteri* (Taylor, 1987),** Koster's springsnail (Federally endangered)
***Pyrgulopsis pecosensis* (Taylor, 1987),** Pecos springsnail (threatened)
***Pyrgulopsis roswellensis* (Taylor, 1987),** Roswell springsnail (Fed endangered)
***Pyrgulopsis neomexicana* (Pilsbry, 1916),** Socorro springsnail (Fed endangered)
***Sonorella todseni* W.B. Miller, 1976,** Dona Ana talus snail (threatened)
***Vertigo ovata* Say, 1822,** ovate vertigo snail (threatened)

The list includes a few land snails (pulmonates), some (mostly minute) freshwater snails, and some freshwater bivalves. The danger to each in this state is habitat destruction. A small springsnail (I don't think many get much over 3mm) living in an isolated gypsum spring or seep is at great risk. Some of these ponds have been completely drained due to ground water pumping and all are susceptible to pollution or introduced alien species. Lose one spring - lose one species. The NM Department of Game and Fish actually monitors such sites fairly closely.

Land snails are generally more widespread in the state, but there are still many that are limited to a single mountain valley or range or even a single peak. For example, almost all of the 30-some species and subspecies of *Ashmunella* in the state are each endemic to a specific mountain range or peak, where most in-

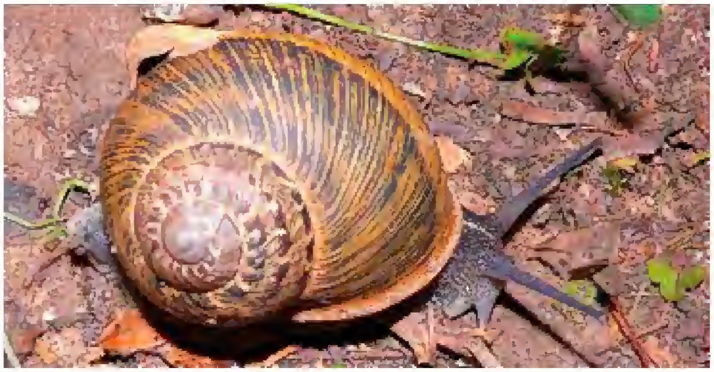

Fig. 1 *Cornu aspersum* (Müller, 1774) (*Helix aspersa* in older references, *Cantareus aspersus* in some Italian research, and *Cryptomphalus aspersus* by Russian writers), the common garden snail, 25mm, originated along the Mediterranean, but has since been spread, deliberately or accidentally, throughout much of the world. In New Mexico it survives in suburban areas as well as in the 'bosque' or riparian area along the Rio Grande. Photo from Wikipedia.com.

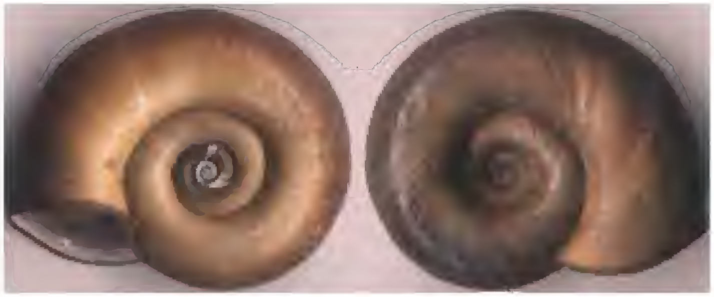

Fig. 2 *Planorbarius corneus* (Linnaeus, 1758), the red or black (depending on color variety) ramshorn snail, is a common aquarium pest introduced with live plants. A prolific breeder, common in decorative ponds and aquariums, it seems unable to survive New Mexican winters. Photo by Michael Manas, released through Wikipedia.

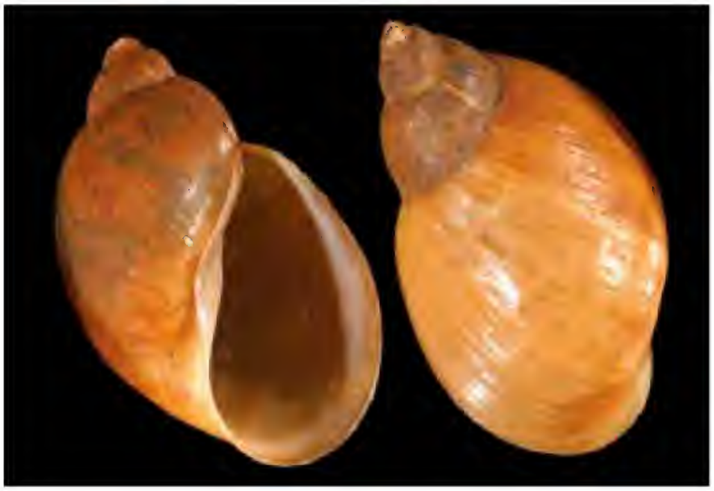

Fig. 3 *Radix peregra* (Müller, 1774), the small or wandering pond snail, 14mm, has been introduced from its original habitat in Europe through much of Asia and into the United States. Introduced into New Mexico with imported decorative water plants for backyard ponds.

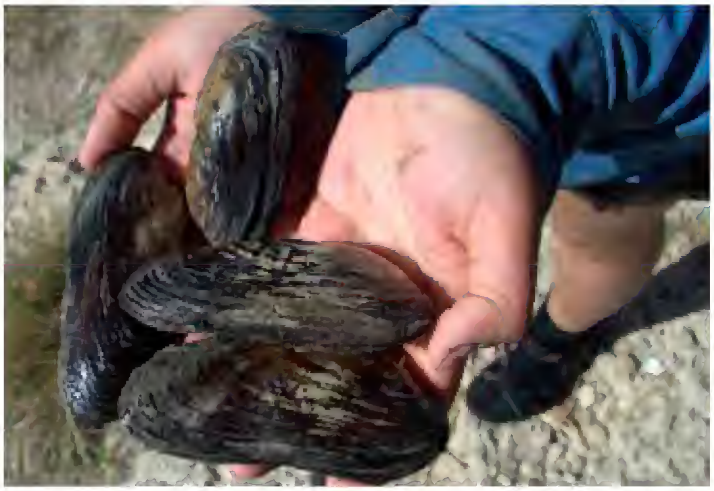

Fig. 4 *Popenaias popeii* (Lea, 1857), the Texas hornshell, 85mm, is listed as an endangered species in New Mexico (doing fine in Texas). It presently inhabits a 9-mile reach of the Black River (a tributary of the Pecos River) in the southeastern part of the state. At one time it could be found in the Rio Grande, the Pecos, and the Black River. The population is considered stable at present. Photo by Joel Deluxe and released through Wikipedia.

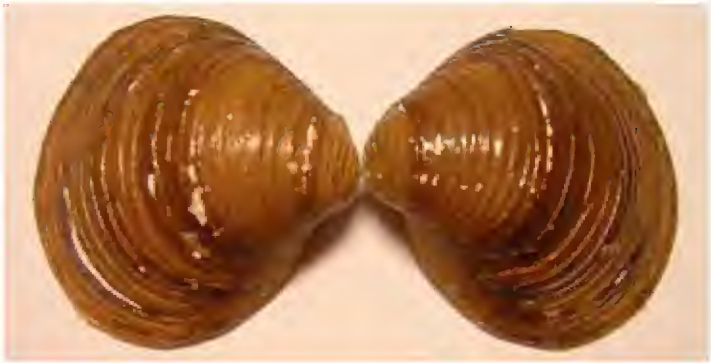

Fig. 5 *Corbicula fluminea* (Müller, 1774), the Asian or Asiatic clam, 25mm, has been introduced and successfully established worldwide. In New Mexico it is commonly found in the Rio Grande and especially the complex system of drainage and irrigation ditches that parallel much of the river. Although it can grow to 50mm, it seems the smaller ones are more commonly encountered. Photo by Aad van Meerkerk, released through Wikipedia.

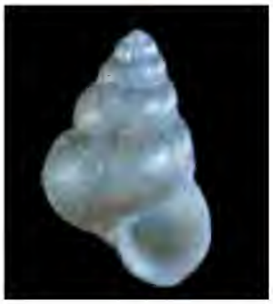

Fig. 6 *Assiminea pecos* Taylor, 1987, the Pecos assiminea or Pecos springsnail, 2mm, is listed as endangered by the state and the federal government. Its preferred habitat is moist soil near a seepage or small spring. It apparently does not tolerate changing water levels. It is known from two small springs in Texas and the Sago Springs in southeastern New Mexico. Photo by Brian Lang, New Mexico Department of Game & Fish.

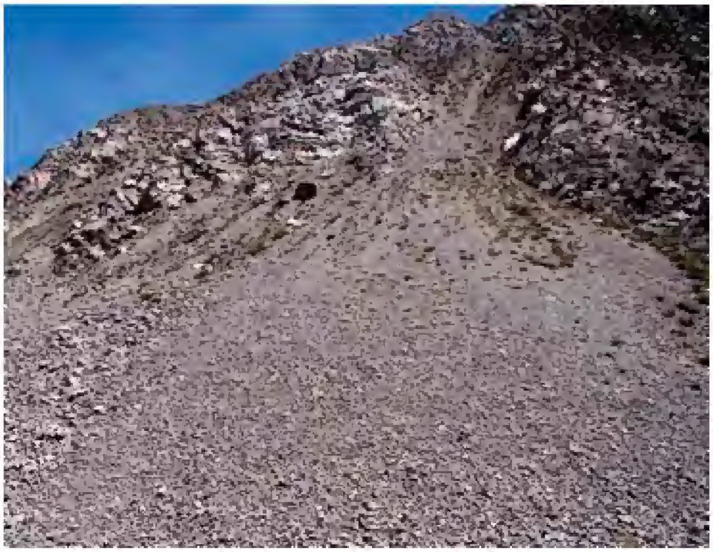

Fig. 7 A typical talus slope that can be found along mountain ranges in southern New Mexico. It is just as steep and treacherous as it looks. Throw in a bit of August heat, lightning from afternoon thunderstorms, and the odd rattler or two, and you have land snail collecting in New Mexico.

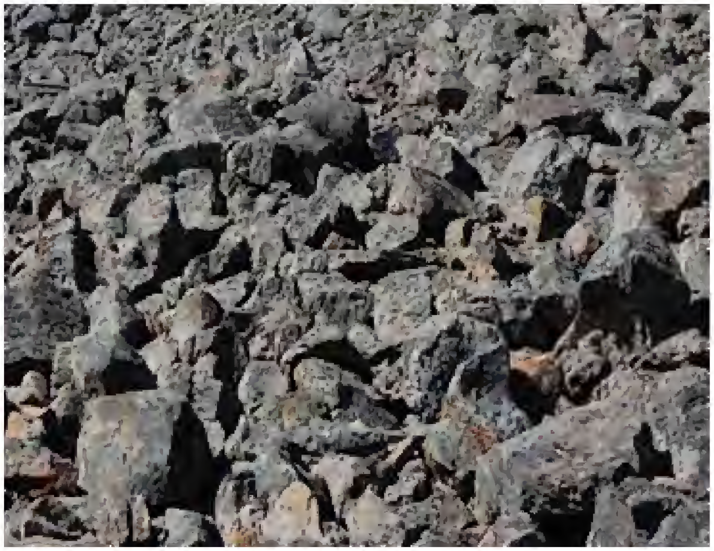

Fig. 8 A closer view of the igneous rocks that make up the talus slopes such as those found in the San Luis mountains. The snails are two to six feet down in debris that collects under the rocks.

habit the talus slope (the area of broken rocks that have fallen from the mountain peak). Most remain underground through much of the year to avoid desiccation, coming out in late summer when the state gets the largest portion of its limited rainfall. Annual rainfall where I live is less than 8 inches per year (much less the last 10 years) and only about 28 inches in the nearby mountains. One third to one half of these totals falls in late July, August, and early September from afternoon thunderstorms. This all means these snails are really tough to collect. The typical talus slope habitats are steep, the footing is horrendously tricky, and these slopes are the preferred habitat for a couple of our rattlesnake species. This means a shell collector turning over a rock looking for an elusive land snail can just as likely find an irritated rock rattlesnake (*Crotalus lepidus* (Kennicott, 1861) or maybe even the rare and protected ridge-nosed rattlesnake (*Crotalus willardi* Meek, 1905). Of course, this works both ways; an individual flipping rocks looking for a rattlesnake can instead find a land snail. Yes, some people do that. Even I have been known to partake.

A friend of mine, Charlie Painter, is the herpetologist for the New Mexico Department of Game and Fish. In 1997 he was turning rocks looking for ridge-nosed rattlesnakes as part of an on-going study by the NM Department of Game & Fish in the San Luis Mountains in southwestern New Mexico (the 'bootheel'). Under one of the rocks were a couple of land snails he did not recognize. He collected them (the NM Department of Game and Fish keeps a voucher collection) and informed Brian K. Lang, a malacologist (among other duties) for the NM Department of Game and Fish. This started a long process of first trying to identify the snail, then ascertaining if it was a variety of a known species, then checking it against all known species in that genus to see if it had been introduced to the area from somewhere else, and finally determining if it actually was an undescribed species.

Once initially discovered, many additional specimens were found in the San Luis, Big Hatchet, and Peloncillo Mountains of Hidalgo County, New Mexico. The expertise of Lance H. Gilbertson from the Natural History Museum of Los Angeles County was added to that of Brian Lang and the snail was studied at length. It was determined to be in the genus *Sonorella* Pilsbry, 1939, a genus with over 100 taxa in the Southwestern United States and the adjacent Mexican states of Chihuahua and Sonora. Pilsbry and subsequent authors further divided *Sonorella* into subgenera and 'species groups.' One such group is the *Sonorella hachitana* complex, with four described species and two subspecies in New Mexico. To this, Lang and Gilbertson (2010) added a new species, *Sonorella painteri* Lang & Gilbertson, 2010 (Figs. 9 & 10), and they raised the two subspecies to full species rank. This raises the number of land snail species for the state from 114 to 117. Most of these species are micro, but *Sonorella painteri* is actually visible to the naked eye at somewhere around 20mm.

With all of these land snail species in the state, what have I collected besides *Cornu aspersum*? Nothing. I do have five specimens of New Mexican land snails, all given to me by COA member and friend, Bruce Neville. In a single day of scratching around in the dirt on the mountain top just east of Albuquerque, he found:

Microphysula ingersolli (T. Bland, 1875) 3mm
Oreohelix neomexicana Pilsbry, 1905, 6mm
Pupilla muscorum (Linnaeus, 1758) 2.1mm
Succinea grosvenori Lea, 1864, 5mm
Vallonia cyclophorella Sterki, 1892, 1.8mm

The data for all five shells are: "Dirt and leaf/needle litter along trail below Crest House, west side of Sandia Crest, ele. 10,600 ft, Bernalillo County, New Mexico, by Bruce Neville, 7 Sep 2004."

Thus none of my New Mexican land snails is large enough to be seen without serious magnification. I marvel at any-

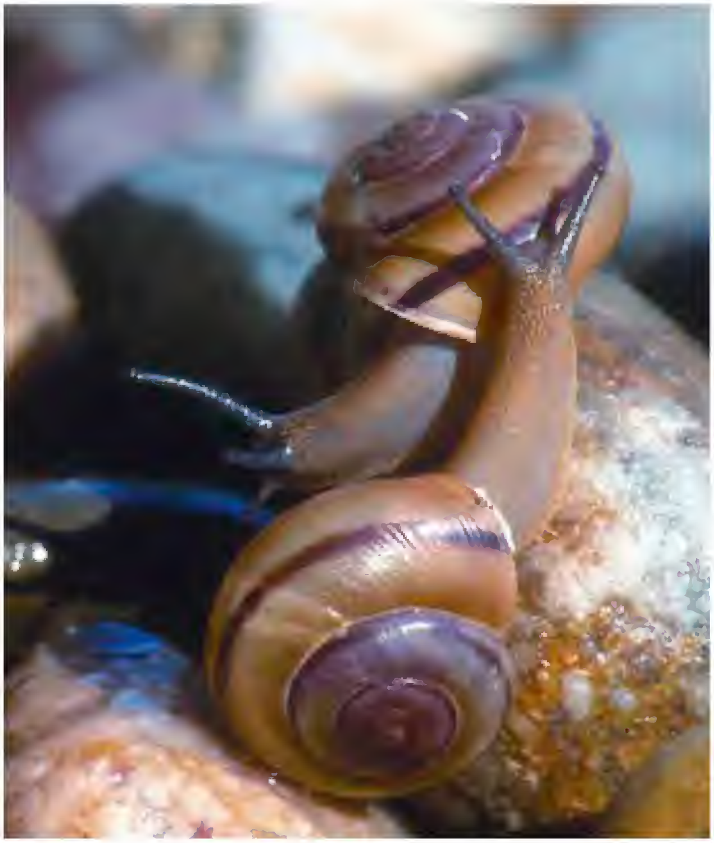

Fig. 9 Two live specimens of *Sonorella painteri*. Even though found in an extremely harsh environment, these snails are moderately-sized (20mm) and nicely colored and patterned. Photo by Marty Frentzel.

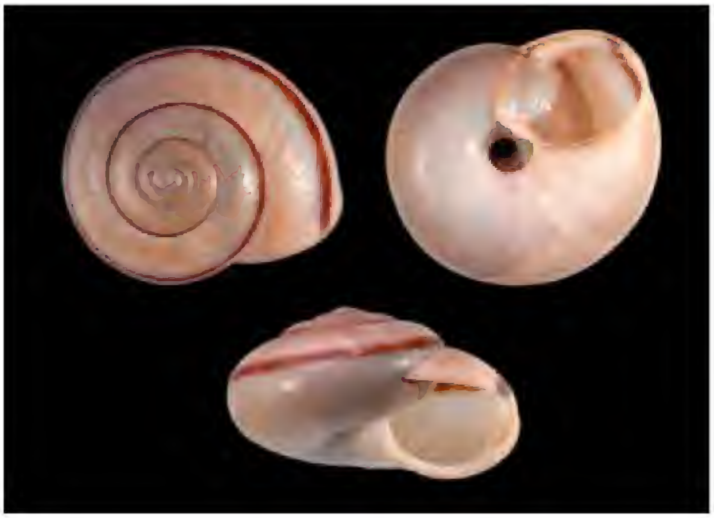

Fig. 10 *Sonorella painteri*, 20mm, talus slope, San Luis Mountains, Hidalgo Co., New Mexico. Family: Helminthoglyptidae. The genus *Sonorella* is found "...from the Grand Canyon area of Arizona, southeastward across Arizona, and into northeastern Sonora, Mexico. The genus also occurs, but with far fewer species, in southwestern and south-central New Mexico, Trans-Pecos Texas, and northern Chihuahua." (Metcalf & Smartt, 1997). The 25 paratypes range in size from 19 to 24mm. Image a composite of photos by Dan Williams.

one (Bruce) being able to find, much less identify, such small specimens. I have walked that same trail dozens of times, never suspecting what was underfoot. I do own the book on our state's land snails and it does have an excellent key and maybe one day I will brave the heat, treacherous footing, thunderstorms, and rattlers to find a *Sonorella* species or two. It should be noted that collecting on a talus slope usually involves a bit more than turning over a few rocks. To quote Brian Lang, "You have to dig two to six feet into the talus before you even start to find snails." (in Williams, 2010) For anyone interested, the rattlesnakes are much more accessible and usually spotted under and around the top layer of rocks.

Finally, to the 117 native land snails native to New Mexico, may be added 9 introduced species (3 are slugs and all originated in Europe) (Metcalf & Smartt, 1997):

Cecilioides acicula (Müller, 1774) (blind awlsnail)
Cornu aspersum (Müller, 1774) (brown gardensnail)
Oxychilus draparnaudi (Beck, 1837) (black-bodied glass snail)
Polygyra septemvolva Say, 1818 (Florida flatcoil)
Rumina decollata (Linnaeus, 1758) (decollate snail)
Vallonia pulchella (Müller, 1774) (lovely vallonia)

Slugs:
Arion fasciatus (Nilsson, 1823) (orange-banded arion)
Lehmannia valentiana (Férussac, 1821) (three band gardenslug)
Limax flavus (Linnaeus, 1758) (yellow gardenslug)

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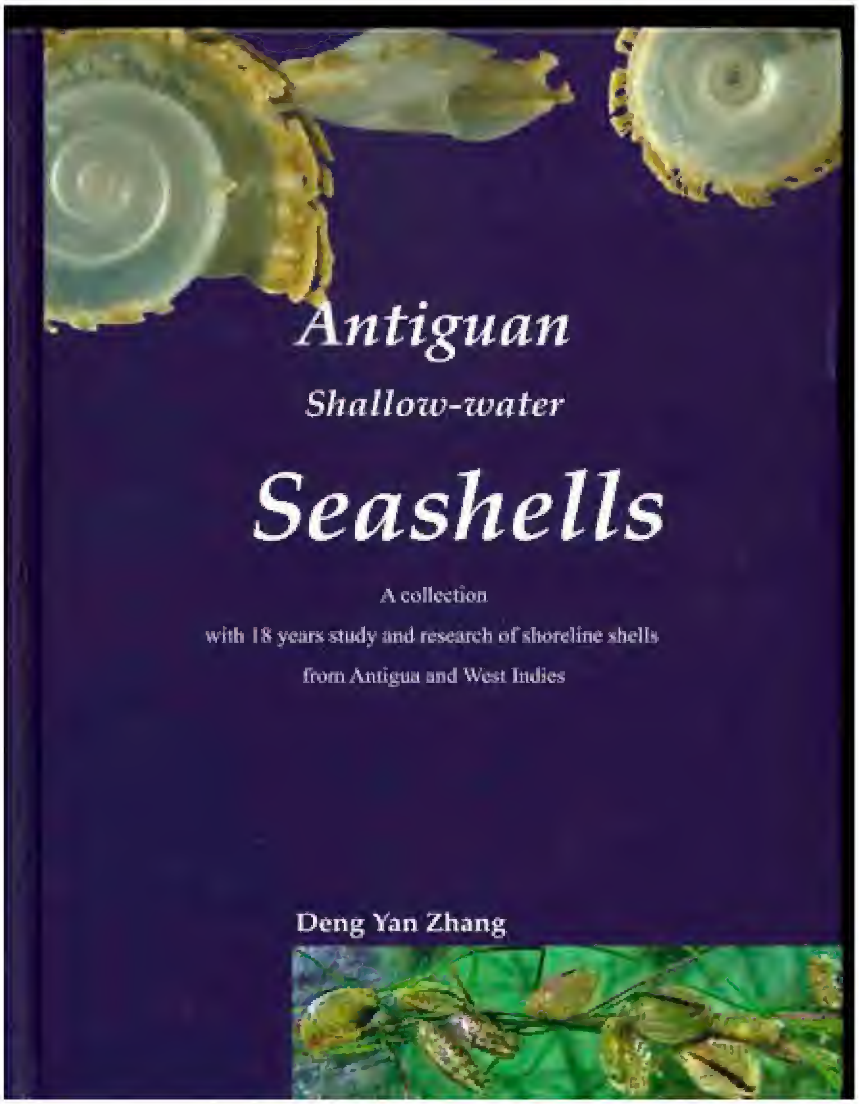
Carman, S.M. 2007. Texas hornshell *Popenaias popeii* recovery plan. NM Depart of Game & Fish, Conservation Services Div, Santa Fe, NM, online at: http://www.wildlife.state.nm.us/conservation/threatened_endangered_species/documents/TXHornshellRecoveryPlanFinal.pdf

Lang, Brian K. & Lance H. Gilbertson. 2010. A new species of *Sonorella* (Gastropoda: Pulmonata: Helminthoglyptidae) from southwestern New Mexico, with a revision of the subspecies of *Sonorella hachitana* (Dall). *Proceedings of the Biological Society of Washington* 123(1): pp. 62-71.

Metcalf, Artie L. & Richard A. Smartt. 1997. *Land Snails of New Mexico*. New Mexico Museum of Natural History and Science, pp. 145.

Williams, Dan. 2010. Meet *Sonorella painteri*, New Mexico's newest species of land snail. *New Mexico Wildlife*, vol. 55, no. 3, fall 2010, p. 7. online at: http://www.wildlife.state.nm.us/publications/documents/NM_Wildlife/archives/fall2010.pdf

Antiguan Shallow-water seashells: A collection with 18 years study and research of shoreline shells from Antigua and West Indies



Deng Yan Zhang, 2012

MdM Publishing, Wellington, FL. xi + 1-(211) + 22 item errata sheet, March, ISBN 978-0-615-34335-8. 8 1/4 by 11 3/4 in; hardbound. Available from the publisher <http://www.mdmshellbooks.com/> and ConchBooks <http://www.conchbooks.de/>

A new shell book arrived this past week and I feel compelled to post a short review of it since it deals with a subject close to home, both in terms of geography and topic. The standard for excellence in combining (1) the interpretation of a regional malacofauna and (2) one man desk-top publishing was set over a decade ago by Colin Redfern's work on the shells of Abaco, Bahamas (Redfern, 2001). Deng yan Zhang has followed this paradigm very closely with his treatment of the shoreline shells of a 281 km^2 constituent of the Leeward Island archipelago. The author, known to many of us COA conventioneers as "Deane," has spent most of the last two decades on Antigua after emigrating from China. At the time of his arrival on this anglophone West Indian tourist mecca, he had never collected a shell, could neither read, write, nor speak English, had no formal training in marine biology, taxonomy, or curation, could not use a computer, and knew very little about photography. Early on, however, providence intervened and Deane met Antiguan Ickford Reid whom he credits for fueling the conchological impulse and providing guidance, particularly in the field.

This book is a testimonial to Deane's essentially incredible journey into malacology. Without the support of institutional resources and funding - not to mention the preparation cited above, he has accomplished an exhaustive, accurate, and well-presented treatment of the topic defined in the book's title. Just the amount of field work needed to have accomplished this thorough a sampling virtually on a shoreline anywhere is mind-boggling. And then there's the challenge of assembling and interpreting the literature! Perhaps Bob Janowsky's comment in the foreword: "Deane does not so much as read books as he devours them" gives an indication to the devotion and intensity of the author's research. One can only speculate how the mastery of computer and photographic skills was wrought, but this work gives attestation to those accomplishments, and Janowsky assures us there was no *deus ex machina* at work here - just an ample volume of midnight oil.

Inside a handsome and durable cover is Janowsky's foreword, a short table of contents, a regional and a more detailed map depicting Antigua, and a brief introduction by the author. Here for the first time we encounter a most interesting style of writing, which those familiar with Chinese-to-English prose will probably recognize. Janowsky's reasoned analysis: "In Chinese each 'word' is a combination of pictographs that establish a thought... you must see the words in the entire context of what he is saying and the meaning will be there" seems to be on the mark as I had little difficulty comprehending Deane's written word.

Pages 1 through 190 are devoted to the taxonomic treatment of the fauna. The format is almost uniformly verso figure explanations with facing (recto) composite **color** images - 95 couplets, as it were. The photography is good to distinctly excellent, and magnification of the many micromollusks is quite adequate in almost all cases. Because of the great difference in actual specimen size, the measurement (mm) is captioned in juxtaposition with the image. In a class, each image and species-level taxon has a unique and consecutive number (almost, anyway; see next sen-

Antiguan
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A collection
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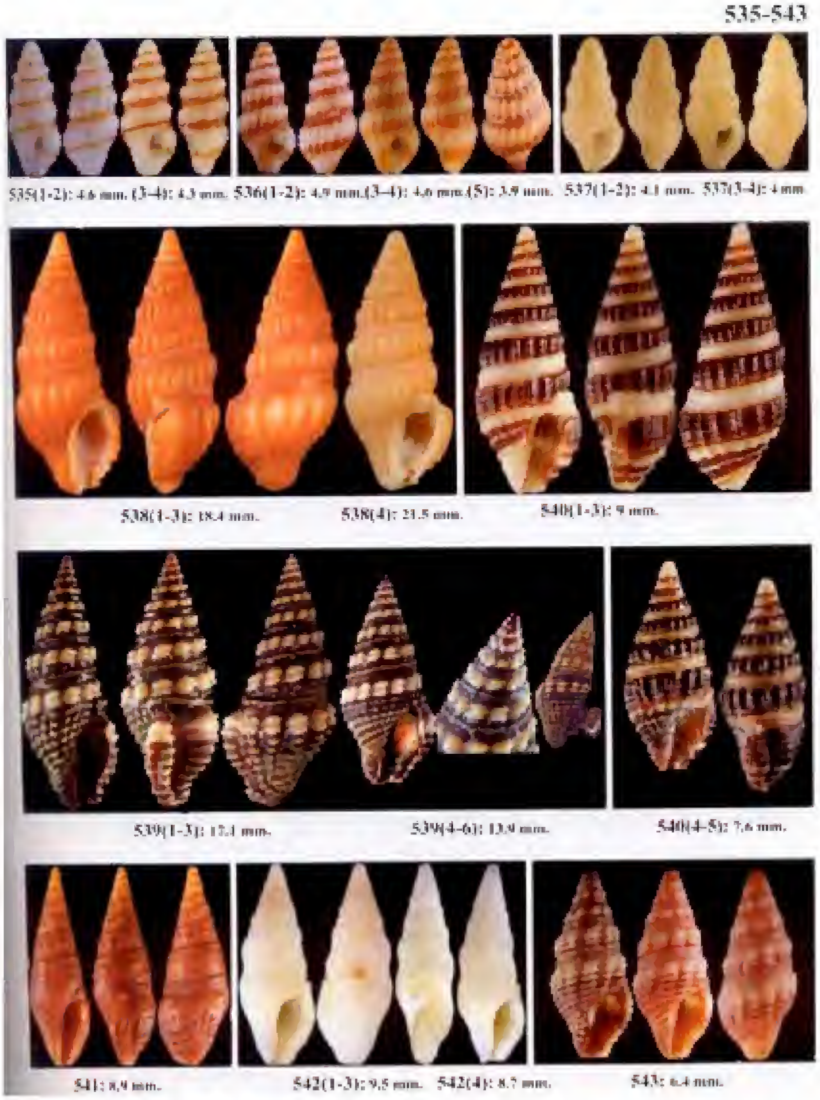
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543: 6.4 mm.

This is a reproduction of page 146. These are Crassispirinae, a subfamily of Turridae that are small and very difficult to identify. This color plate is a full 8 1/4 by 11 3/4 inches, which means each image is large enough to show detailed shell structure and, because Zhang provides multiple viewing aspects, what was difficult to identify becomes almost easy.

tence) in the now familiar style pioneered by the late Myra Keen (1971). Deane writes that there are 2,860 color illustrations, and I have no reason to dispute that since I counted the number of species-level taxa featured and his "963" was right on the mark. Although a total of the last taxon number within each class adds up to 972, there are three additional listings (bivalve 165a; gastropods 182a, and 431a), and twelve nos. are skipped (bivalve 113; gastropods 136, 193, 207, 307, 348, 336, 428, 438, 512, 591, and 662). The figure explanations include the scientific name, author and date; a common name when available in the literature, a short description focused on differential diagnosis; maximum size; locality(-ies) in Antigua; "occurrence" (frequency of collection); occasionally a final entry, " Formerly," indicating a previous generic placement. In this portion of the book, Deane's English is quite constrained, scientifically measured, and apt. I had no more trouble comprehending it than my own productions of this genre.

The testy family groups (e.g., Galeommatidae, Cerithiopsidae, Triphoridae, Eulimidae, Marginellidae, Pyramidellidae, and the shell-less gastropods), like the push-overs, are tackled with gusto and treated well with sound illustrations, descriptions, identifications, up-to-date nomenclature, and (for the later group in particular) live animal images. In testimony to the cumulative virtue of science, many of the innominate taxa treated by Redfern (*loc. cit.*) have, in good part due to his labors, subsequently been described in a number of works by Rolán and his collaborators, Faber and others, and found their way into the present work.

There are a small number of type-style, spacing, and other formatting peccadilloes, but I only found one misspelled taxonomic name: *Rissoina canbcellina* [sic]. As it turns out that actually originated on the same keyboard I am using for this report; it was taken from an email from me to Deane! Here the reader might wonder by what authority I deign to write this critique!

Some readers might dispute the splitting of *Modulus* and *Oliva* spp. and attention to "forms" of *Vasum globulus*, but the images and descriptions are there to support the author's decisions.

Short version: the book is a masterpiece, a special tribute to a phenomenal, self-taught, gifted dynamo, and it is absolutely a necessity for the bookshelf of every serious student of the tropical western Atlantic marine malacofauna. The price, $99.95, is a bit steep, but, aside from the excellent science, the shopper must factor the 2860 color images into the decision tree.

Keen, A.M. 1971. S*ea shells of tropical west America*. Stanford Univ. Press, CA, pp. 1-1064 incl. numerous figs. + 22 pls. 1 Sept.

Redfern, C. 2001. *Bahamian seashells a thousand species from Abaco, Bahamas.* Bahamianseashells.com, Inc., Boca Raton, pp. 1-280 + ix + 120 pls.

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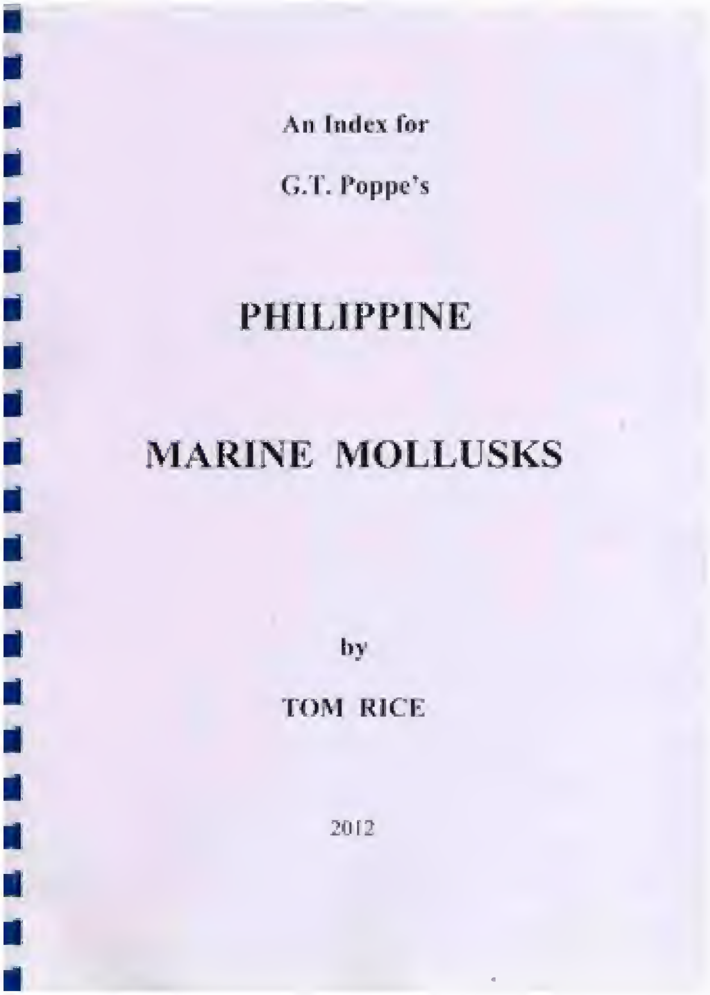
An Index for G.T. Poppe's PHILIPPINE MARINE MOLLUSKS

Tom Rice, 2012

Of Sea and Shore Publications, Phuket, Thailand. 222 pages, price $25 plus shipping, available from ofseaandshore@gmail.com (see ad on page 13)



An Index for

G.T. Poppe's

PHILIPPINE

MARINE MOLLUSKS

by

TOM RICE

2012

This is actually one of the easier reviews I have had to write. If you own the four volume set of Philippine Marine Mollusks by G.T. Poppe, then you MUST buy this index by Tom Rice. Even if you do not have all four volumes, you still need this index. The Poppe tomes are superb in their coverage of Philippine mollusks, but they are massive volumes. If you want large color plates to show detail and you want coverage of the many thousands of mollusks found in the Philippines, then you end up with large heavy books. This means you do not want to pull volume one out and leaf through it only to discover that the cone you were searching for is not covered in this volume - cones are in volume two. I have gone through this process a number of times and found it frustrating, but decided it was an okay price to pay considering the value of the books. Tom Rice must have also found this an irritant and he came up with the solution - an index to all four volumes.

If this was just the standard index found in the back of most reference books, it would still be worth more than the asking price. Tom's index is, however, so much more than a 'standard index.' Listings are alphabetical (of course), and include both separate and combined entries for family, genus, and species. Each is listed with volume and page number. The genus and species also have the author and date listed. This means if you look for "Conidae" you will find it on page 43: "CONIDAE **II** 547-660; **IV** 1270-1273." The bold Roman numeral is the volume number, followed by the page number(s). If you look for "*Conus*" you will also find it on page 43: "***Conus*** Linnaeus, 1758 **II** 547-660; **IV** 1270-1273 [Conidae]." So Tom has listed where the genus can be found, the author and date of the genus, and the family of the genus. The genus is listed in bold type and following this listing of the genus *Conus* is a listing of all of the Philippine *Conus* species in the books. So if you look for *Conus capitaneus*, you would find it further down on page 45: "*Conus capitaneus* Linnaeus, 1758 **II** 562(5-9); * **II** 534." Again, the author and date are listed, the volume, the page numbers where the species is covered (illustrated), the figure numbers of the specimens in parentheses, and in this case, an asterisk indicating the volume and page number of an image of the living animal. Finally, if you do not know the genus, or are uncertain, you can look up just the species name. If you look for *capitaneus* you will find it on page 27: "*capitaneus*, *Conus* **II** 562(5-9); * **II** 534." Reading through this description might seem a bit confusing, but in actual use it is simplicity itself.

This index is an invaluable tool, in and of itself, even without the referenced four volumes. Just a listing of Philippine molluscan families, genera, and species, with authors and dates, is of real value. Link that with the four Philippine volumes and you have a required, must have, reference tool. I repeat, must have. Tom also promises an update when volume five is published (planned for one to three years from now). In the interim, all of the species planned for inclusion in volume five are listed in this index as: "**Sup. I** [2012]."

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John Edward Gray (1800-1875): his malacological publications and molluscan taxa

Richard E. Petit, 2012

Zootaxa 3214, Magnolia Press, Auckland, New Zealand, pp. 1-125, ISSN: 1175-5326 (print edition), 1175-5334 (online pdf)

Richard Petit's works have been reviewed previously in this publication. Two of these reviews stand out in relevance to his present work: "Lovell Augustus Reeve (1814-1865): malacological author and publisher," published in 2007 and reviewed in the March 2008 issue; and "George Brettingham Sowerby, I, II, III: their conchological publications and Molluscan taxa," published in 2009 and reviewed in the December 2009 issue. These works profiled luminaries in the conchological universe, laying out a brief life history of each, explaining and examining their contributions to conchology (including an annotated listing of introduced taxa), and providing an inclusive and heavily annotated listing of their molluscan-related publications. Petit fleshes out what to many have been just names made familiar through data slips. He also provides corrected taxonomies, including: synonymies, spellings, and dates. We now have his newest entry on John Edward Gray, a name not quite as familiar as the Sowerbys or Reeve, but arguably, just as important.

As stated by Petit, John Edward Gray (1800-1875) was a "...prolific writer who introduced hundreds of new families, genera, and species in Mollusca. As Gray was knowledgeable in all fields of zoology, his publications on Mollusca are only a portion of his production." Gray attended medical school, but lacking the stomach for surgery, gave it up. He worked with his father on a natural history volume on botany and assisted W.E. Leach at the British Museum of Natural History. He applied in 1822 for membership in the Linnaean Society, but was refused because he did not agree with the strict ideas of taxonomy (zealously guarded by E.A. Smith) currently in vogue. His marriage to Emma Gray was fortuitous as she was also interested in science and copied his illustrations for five volumes on mollusks. She was independently wealthy, allowing them both to travel Europe and establish relationships with various museum personnel on the continent.

Gray worked diligently through many years to obtain a position as Assistant in Charge of Zoological Collections with the British Museum, only to be thwarted by petty politics and the actions of several well-placed people with an open animosity towards him. He worked voluntarily for a time and then as an assistant, not the Assistant. Gray was well respected in Europe and in 1854 was awarded the honorary degree of Doctor of Philosophy by the University of Munich. He declined a knighthood but accepted a Gold Medal of Merit from Würtemberg and a Silver Medal from the Academy of Stockholm. At home in England he was ignored by the crown, the museum, and the universities, though all benefitted from his support and actions.

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Monograph

ZOOTAXA

ZOOTAXA

3214

John Edward Gray (1800–1875): his malacological publications and molluscan taxa

RICHARD E. PETIT

Magnolia Press
Auckland, New Zealand

Accepted by D. Geiger: 10 Nov. 2011; published: 29 Feb. 2012

Gray published over 1,000 papers and books and was often criticized for rushing to publication, sloppy science, lack of proof reading, etc. This caused numerous 'typos' in his work and subsequent misspellings by authors who attempted to correct what Gray had published. Families, genera, and species named by Gray are all listed by Petit and annotated with corrections as to spelling, synonymy, etc. Reading through this rather lengthy list, it seems well over a third of the entries include the phrase, "incorrect subsequent spelling." Petit also includes a number of nomenclatural actions under ICZN rules to establish precedence (both as 'First Reviser" and to establish a *nomen protectum*) and to correctly fix type species. For example, the well-established *Trochus pellisserpentis* Wood, 1828 is declared *nomen protectum* over the earlier but never used *Trochus emma* Gray, 1827, now *nomen oblitum*.

This work is astonishing in its depth and detail. Anyone conducting molluscan research would be well advised to confirm names, dates, authors, spellings, and synonymies with this present publication. Even if you have no specific interest in the taxonomic tribulations found in conchology and malacology, the history of Gray and his troubles with various contemporaries (including both G.B. Sowerby I and Reeve) are well worth the read. My copy of this publication is a pdf downloaded from Zootaxa: http://www.mapress.com/zootaxa/ (click on the year 2012, then on publication 3214). I now plan on purchasing a hard copy, it is well worth it.

Thomas E. Eichhorst

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The 75th Annual Sanibel-Captiva Shell Show

Joyce Matthys

After a year of planning, the 75th Annual Sanibel Shell Show will be looked back upon as probably one of the best, if not the best, shell show in the club's history. The scientific and artistic competitions were full and the exhibits were exceptional. The weather, though warm, provided a true Florida atmosphere and the visitors were enthused about their 'shell show' experience.

The festivities began with the Judges and Awards Reception. Usually about 65 persons attend this event, traditionally held at a local restaurant. This year we were hosted by the Bailey-Matthews Shell Museum. To say that the number of people who wanted to attend the reception this year overwhelmed the shell show committee would be an understatement. Over 130 people attended the function.

Special champagne glasses were raised for a toast to the success of the show at the beginning of the evening. Donald Dan graciously provided the champagne.

Club President and Shell Show Chairperson Anne Joffe was presented with a bouquet of flowers in appreciation for all of her work this past year to make this 75th Annual Shell Show a success. She also worked with the Sanibel Community Association to make the 'Shellabration' an island-wide event. Anne's efforts throughout the past year truly paid off. Although the numbers are not all in, it appears that the show will also be a financial success. The monies raised during the shell show will be used for academic grants and scholarships.

Such an event cannot be a success without the dedication of and hard work by a number of people. Club members worked every aspect of the show, whether selling tickets, acting as hosts or hostesses, or donating food or cash so that members and exhibitors spending the entire day at the show did not have to leave to find a bite to eat.

A special thanks goes out to the people from Periwinkle Park for their help, and to Joel Edinburg, Dave Joffe, and Mike Joffe for taking down the tables after the show.

The following members of the club worked tirelessly to ensure the show's success:

Show Chairperson - Anne Joffe
Artistic Chairperson - Sandy Moran
Asst. Artistic Chairperson - Mary Burton & Charles Barr
Scientific Chairperson - Joyce Matthys
Entries & Data - Dick Willis
Ribbons & Trophies - Valerie Saft
Show Finances - Linda Edinburg
T-Shirt Sales - Dick & Freda Willis
Vol. Coordinators - Linda Edinburg & Stacy Edinburg
Hospitality - Dianne Zimmer
Awards Event - Donald Dan
Author's Table - Irene Longley
Shell Sales - Donald Dan

The Sanibel-Captiva Shell Club meets at 2 p.m. on the third Sunday of the month at The Bailey-Matthews Shell Museum, 3075 Sanibel-Captiva Road, Sanibel, Florida, from October through March. In addition to the business meeting and a program, the meetings include members' presentations on favorite or recently found shells, door prizes, and refreshments. To confirm the next meeting date and topic, contact President Anne Joffe at (239) 472-3151, e-mail us at sancapshellclub@gmail.com, or check the current edition of our newsletter, *The Junonia* (www.sanibel-captivashellclub.com).

This year's winners:

Scientific Division:
-Dupont Trophy - (best in class) Sheila Nugent
-COA Award - Robert & Alice Pace
-Best Sanibel-Captiva Shells, self-collected - Harold & Marguerite Pilcher
-James VunKannon Award - (best Florida-Caribbean shells, any source) Carolyn & Earl Petrikin
-Howard Sexauer Award - (best entry worldwide shells, any source) Ron & Mary Jo Bopp
-Marilyn Northrop Award - (best entry worldwide, any source) Joesph Weise
-Shell of Show - (any source) Dick Willis
-Shell of Show, fossil - Irene Longley
-Sanibel Comm - (best student exhibit) Marissa Linn
-Best of the Blues - Harry Berryman
-Sanibel Superstar Trophy - Gene Everson
-Judge's Special Awards - Ron & Mary Jo Bopp, Gregory Curry, and Bobbi & James Cordy
-Judge's Merit Ribbon - Gene Everson

Artistic Division (hobbyist):
-Myrtle Williams Weinstein Award - (best shell flower exhibit) Leslie Anding
-Gertrude A. Ford Perpetual Trophy - (best miniature shell flower arrangement) Peter Gabel
-Best Picture or Mosaic - Valerie Robinson
-Flo Ioreo Award - (best lamp) Donna Carey
-Wanda Will Award - (best jewelry) Judy Mackey
-Dorothy K. Putnam Trophy - (best mirror) Sally Jane Moore
-Best Single Sailor's Valentine - Donna & Rob Barnes
-Best Miniature Sailor's Valentine - Jeanne Ford
-Bettie K. McGowan Award - (best holiday exhibit) Sharon Thomas
-Best Shell Related Exhibit - Marilee McNeilus
-Daniel E. Malone Award - (best student exhibit) Emily Johnson
-Best in Show - Peter Gabel

Artistic Division (professional):
-Best Single Sailor’s Valentine - Judy Dinnick
-Best Double Sailor’s Valentine - David Rhyne
-Best Miniature Sailor’s Valentine - Brandy Llewellyn
-Best Medium Sailor’s Valentine - Judy Dinnick
-Best Flower Exhibit - Goz Gosselin
-Meta Neujahr Award - Cheryl Whitten
-Best Picture or Mosaic - Constance Marshall Miller
-Best Miscellaneous Exhibit - Hatsue Iimuro
-Captain Tom Clifford Award (Best in Show) - David Rhyne

All Artistic:
Judges Special Ribbon: David Rhyne, Judy Dinnick, and Goz Gosselin
Judge’s Merit Ribbon: Susan Lloyd
Special Award for “Celebrating 75”: Constance Marshall Miller

Ribbons (scientific): Jeff Oths, Victoria Ross, Evelyn Spencer, Joe Anding, Dick Willis, Ron & Mary Jo Bopp, Irene Longley, Hal & Marguerite Pilcher, Dianne Zimmer, Carolyn Sudol, Sheila Nugent, Libby Grimm, Anne Joffe, and Barbara Hansen

Ribbons (artistic): Sharon Thomas, Tyler Schoenherr, Leslie Anding, Diane Zimmer, Victoria Ross, Travis Campbell, Sally Jane Moore, Brandy Llewellyn, Constance Marshall Miller, Penny Chrysler, Martha Howard, and Charles & Kristine Barr

Above: Bob and Alice Pace won the Conchologists of America Award for their outstanding exhibit of "Invasive Land Snails."

Below: An added bit of excitement this year was the presence of Bill Geist and a news crew from CBS’s “Sunday Morning.” His coverage of the show aired on 18 March 2012.

Evelyn Spencer is shown with two of her winning ribbons. Evelyn not only exhibited at the show, but worked tirelessly every day as a volunteer. All of this at the age of 97!

75 WONDERFUL YE
Dedicated To Those Who Are Gone, But Not F

Above: Anne Joffe with her her "Celebrating 75" exhibit, a tribute to 75 persons who contributed to conchology and are no longer with us. The exhibit had a photograph of each person as well as a shell particularly meaningful to that person.

Below: Ron and Mary Jo Bopp won the Howard Sexauer Award for “Best Worldwide Shells - Any Source” with their display, “Shelling in Guaymas (and San Carlos), Mexico.”

2012 Sarasota Shell Club Scientific Winners

Ron Bopp

The 2012 Sarasota Shell Club Shell Show produced many fine scientific entries for the membership and general public to enjoy. There were 42 different displays entered. Several club members as well as other exhibitors won trophies. Our scientific judges were Roger Portel and Bob Janowsky. Listed below are winners of trophies and special ribbons.

"Florida Spiny Oysters"	Doug Thompson*	COA Trophy
"Color My Fossils"	Joanne Chmielewski*	Hertweck Award (best fossil display)
"Behold the Lovely Abalone"	Martin Tremor/Conrad Forier	Mote Gold Trophy
"NW Gulf of Mexico Beauties"	Doug Thompson*	DuPont Trophy
"Living Cowries with Mantle"	Linda Greiner*	Best Small Scientific Award
"Florida Horse Conch"	Doug Thomson*	Best Self-Collected Award
"Distorsios"	Ron Bopp*	Sarasota Shell Club Award
"Fernandes's Frog Shell"	Linda & Jim Brunner	Shell of the Show
"Florida Tree Snails"	J.R.Shafer	Judges Special Ribbon
"Bivalve Hinges"	Ron Bopp*	Judges Special Ribbon
Pseudadusta metae	Mike Herron*	Fossil Shell of the Show

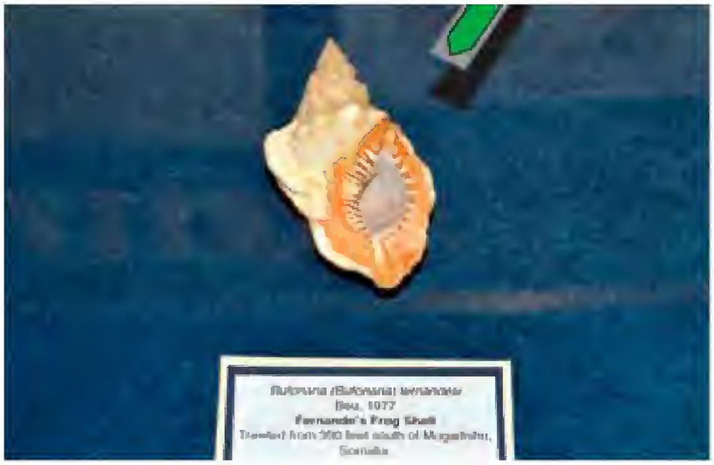
Note: An * behind the name indicates a club member.

Above: Doug Thompson receives the COA Award from Donna Cassin.

Below: A portion of Doug's very colorful, well researched, and educational exhibit, "Florida Spiny Oysters."

Above: Linda Greiner with her Best Small Scientific Award display, "Living Cowries with Mantle."

Below: The shell of the show, an uncommon *Bufonaria fernandesi* Beu, 1977, by Linda & Jim Brunner.



2012 Marco Island Shell Club Shell Show

adapted from information on the club web site:
http://www.marcoshellclub.com/

The highlight of the season for members of the Marco Island Shell Club is the Annual Shell Show - a truly wonderful event! This is a juried show where both fascinating scientific exhibits of shells from around the world are featured as well as breathtaking artistic creations. Ribbons and trophies are awarded for the best items submitted in a wide variety of categories. Shell flower arrangements, shell critters/caricatures, and jewelry are available for purchase as well as specimen shells. The show is a gift shop like no other! All proceeds from the show support the scholarship and grant programs for marine biology at local colleges and universities, providing scholarships annually to undergraduate and graduate students who study marine biology at local colleges and universities. Students in these programs study the environmental sciences and marine life found here in southwest Florida as close as the Ten Thousand Islands. Students at our own Florida Gulf Coast University benefit from these scholarships.

In 2011 The Marco Island Shell Club donated $25,000 to fund an endowment scholarship at Florida Gulf Coast University that will generate a $1,200 annual scholarship. In addition, $3,000 was donated to FGCU to fund the $500 undergraduate competitive research scholarship and the $2,500 graduate competitive research scholarship for deserving marine biology students. In all the Marco Island Shell Club will have distributed over $30,000 for scholarships and grants in 2011. Proceeds from the annual shell show and shell art sales fund these scholarships.

This year the shell show was held on 8 - 10 March 2012. Show Chairman was Paul Campbell. The winner of the COA Award this year was Gregory Curry, Sr. (from the Broward Shell Club) for "*Cymbium* of West Africa." His display was in four cases and extended over eight feet. The judges this year were Bob Lipe and Homer Rhodes. This year's event had over 2,000 attendees. The 'Shells of the Show' were a freak *Strombus alatus* by Amy Tripp and a *Dinocardium robustum* displayed by Charlotte Roman.

2012 Scientific Awards and Trophies:

Du Pont: Amy Tripp ("Uncommon to Rare Shells of Marco Is.")

COA: Greg Curry ("*Cymbium* of West Africa")

Board of Directors Best Shell of Show: Amy Tripp

Dr. William O. Reid (best aesthetic and scientific): Robert Pace

Jerome M. Bijur Trophy (best novice active member of MISC): Marge Tunnell

Best Exhibit of Miniature Shells: Jacob Mitchell

Scribner's Trophy (self-collected Marco Island shells): Dr. William O. Reid

Friends of Tigertail (self-collected Marco Island shell): Charlette Roman

Best Natural History Photo Display: Paulette Carabelli

Judges Merit: Bob Pace, Jacob Mitchell

2012 Artistic Awards and Trophies:

The Joyce Fitzpatrick Trophy (best novice): Carolyn Merrifield

The Bill and Edna Schwartz Hobbyist Trophy: Nancy Maney-Meer

The Floral Trophy (best commercial): Dominga Ong

The Shell Show Committee Trophy (best commercial-non floral): Constance Marshall-Miller

Best Single Sailor's Valentine: Brandy Llewellyn

Best Double Sailor's Valentine: Katie Stewart

The Mary C. Maerker Plaque (hobbyist active member): Georgia Lohmeyer

Honorable Mention: Patricia Schoonman, Patricia Shearman

Judges Merit: Sheila McFarland, Constance Marshall-Miller

Below left: Early show visitors marvel at the colorful displays.

Below right: A table of flowers - all made from sea shells.

St. Petersburg Shell Club awards list:

65th Annual shell show

25-26 February 2012 (photos courtesy of Randy Allamand)

Shell club meetings are held on the second Friday of the month at the Seminole Recreation Center, 9100 113th Street North, Seminole, Florida. The doors open at 6:30pm and the meeting starts at 7:00pm. The public is always invited.

Club President Martin Tremor thanked all participants and added, "A very special thank you for 'far beyond the call' to: Carolyn Petrikin, John and Cheryl Jacobs, Bob Horton, Peggy Dill, Bill Turner, Juliette Pastirjk, Marilyn Wall, Melanie and Ed Thoenes, Doug and Sandy Boddy, Conrad Forler, Alice Monroe, Robert Gould, and Bob and Betty Lipe (co-chairs for the show). These hard-working dedicated people made the show happen."

SCIENTIFIC JUDGES:
- Jose Leal - Bailey Matthews Shell Museum
- Bill Lyons - (Retired) Depart Environmental Protection

ARTISTIC JUDGES:
- Kim Nealon - Graphic Artist from Sanibel
- Helen Kwiat - Orlando Shell Club

NATIONAL MUSEUM OF NATURAL HISTORY AWARD: "In Search of the Acadian Sub-province" - Sheila Nugent

COA AWARD: "Florida *Liguus*" - J. R. Shaffer

DUPONT TROPHY: "Cypraeidae" - Kenneth Brown

FLORIDA MUSEUM OF NATURAL HISTORY: "Northwest Gulf of Mexico Beauties" - Doug Thompson

SHELL OF THE SHOW: "*Amoria grayi kawamurai* Habe, 1975" - Jim Cordy

SHELL OF THE SHOW - SELF-COLLECTED: "*Hexaplex fulvescens* (G.B. Sowerby II, 1834)" - Doug Thompson

SELMA LAWSON AWARD: "Self-collected Spiny Oysters of Florida" - Doug Thompson

DOROTHY HANSSLER AWARD: "Florida Caribbean Treasures" - Carolyn and Earl Petriin

BEST EXHIBIT UNDER 10 FEET: "Apple Snails Love Cape Coral" - Sheila Nugent

EARL CLARK AWARD: "Historic Lewes" - Julia Allen Smith

JUDGES SPECIAL AWARDS:
Scientific:
- "Those Amazing Conchs" - Pat and Bob Linn
- "Shells Found Where?" - Carolyn Petrikin

Artistic:
- "The Stars Will See Me Home" - Julia Allen Smith
- "Contemporary Barbados" - Cheryl Whitten

ONE FAMILY, MAJOR: "Cypraeidae" - Kenneth Brown

ONE FAMILY, MINOR:
First - "Behold the Lovely Abalone" - Martin Tremor
Second - "Family Costellaridae McDonald, 1860" - Harry Berryman

ONE GENUS:
First - "Those Amazing Conchs" - Pat and Bob Linn
Second - "*Xenophora*, the 1st Shell Collector" - HarryBerryman
Third - "Haunting Beauty of the Harp Shells" - Martin Tremor

ONE SPECIES: "State Shell of Florida" - Doug Thompson

SINGLE SPECIMEN SELF COLLECTED:
First - "*Muricopsis zylmanae* (Petuch, 1993)" - Jim Cordy
Second - "*Conus granulatus* Linnaeus, 1758" - Doug Thompson
Third - "*Strombus gigas* Linnaeus, 1758" - Carolyn Petrikin

SINGLE SPECIMEN:
First - "*Amoria grayi kawamurai*" –Jim Cordy
Second - Carolyn Petrikin

BIVALVES: "Self-collected Tiny Spiny Oysters" - Doug Thompson

ONE REGION:
First - "In Search of the Acadian Sub-province" - Sheila Nugent
First - "Northwest Gulf of Mexico Beauties" - DougThompson

FLORIDA CARIBBEAN: "Florida Caribbean Treasures" - Carolyn and Earl Petrikin

JUNIOR: "Treasures of the Beach" - Marissa Linn

LAND AND FRESH WATER:
First - "Land Snails" - J. R. Shaffer
Second - "Apple Snails Love Cape Coral" - Sheila Nugent

SPECIAL: "Shells Found Where?" – Carolyn Petrikin

PHOTOGRAPHY:
First - "Feeding Frenzy" - John Jacobs
Second - "Let's be Friends" - John Jacobs

WALL HANGINGS:
First - "Contemporary Barbados" - Cheryl Whitten
Second - "Life Cast Ashore" - Pat Linn

SAILOR'S VALENTINES:
First - "Ode to Invictus" - Jane Santini
Second - "Historic Lewes" - Julia Allen Smith

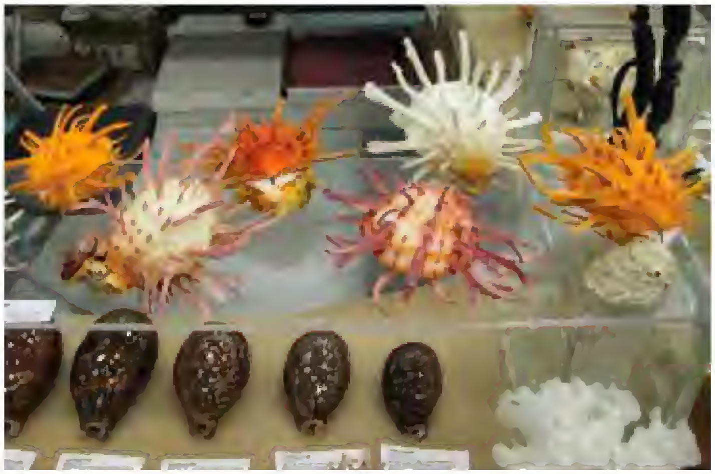
TABLE ITEMS:
First - "Gift of the Sea Nymphs" - Cheryl Whitten
Second - "Floral Arrangement" - Cheryl Whitten

NOVELTIES:
First - "My Name Is Paisley (Torso)" - Caryl Renz
Second - "Flowers" - Brandy Llewelyn

The main hall as it appeared for the 'show' part of the shell show. There were lots of quality exhibits, reflecting a lot of study and hours of preparation by our exhibitors.

J.R. Shaffer won the COA Award for an amazing display of Florida *Liguus*.

Doug Thompson won multiple awards for his self-collected spiny oysters and his spectacular *Hexaplex fulvescens*.



Speaking of spiny oysters, these colorful *Spondylus americanus* Hermann, 1781, were offered up at Randy Allamand's table.

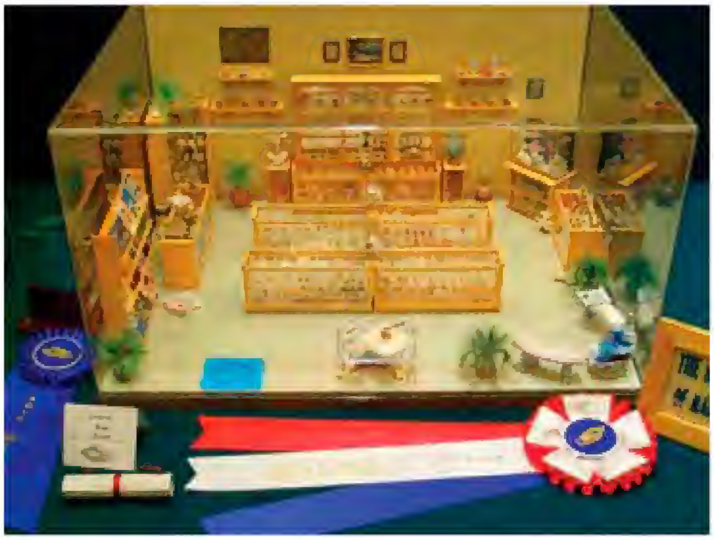
Long-time supporter of COA Donald Dan at his booth with an ever-present smile and lots of incredible shells.

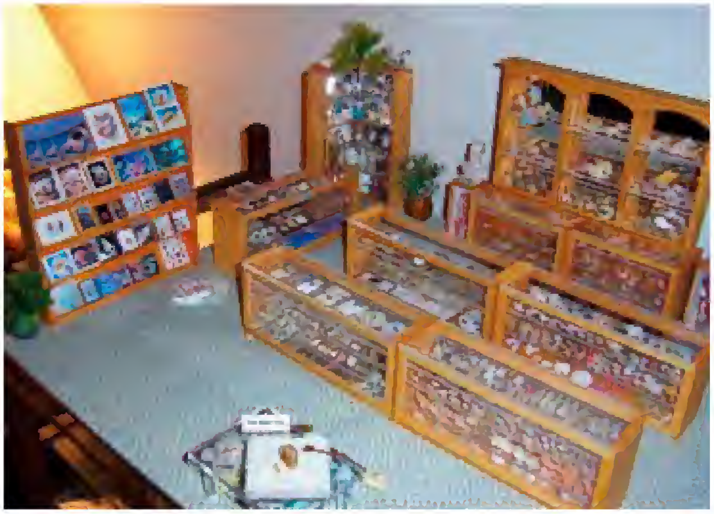
A bit of catching up

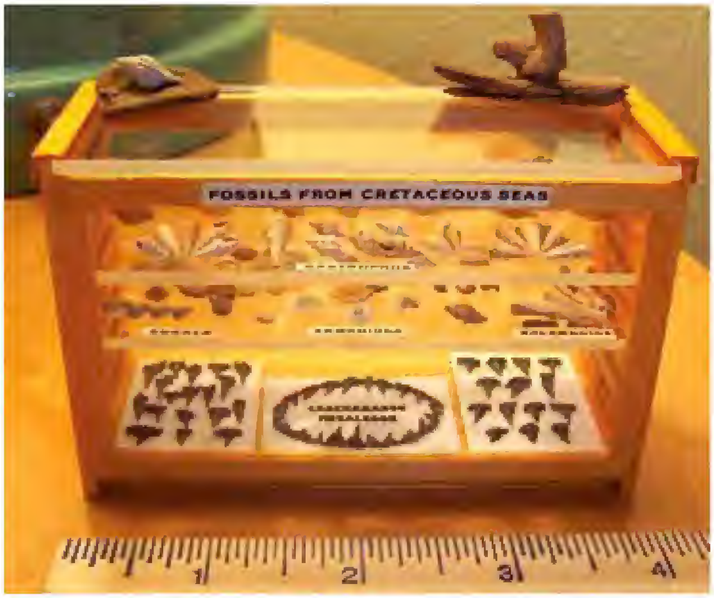
Tom Eichhorst

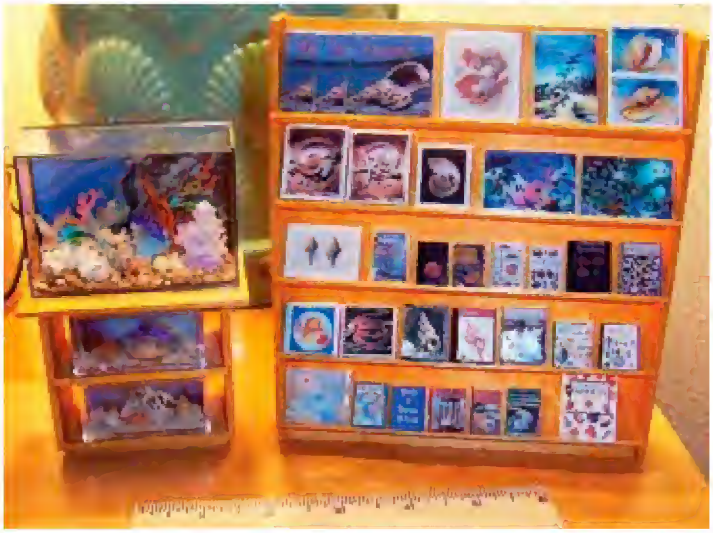
While putting together this issue of *American Conchologist*, I ran across some images I had filed away two years ago, with every intention of sharing them in this magazine. Those who really know me know that my main filing system consists of various piles on my desk, other handy surfaces, and yes, even the floor. One of my granddaughters recently offered, "Grandpa, if you would like, I will help you clean up your office." All of this as a *mea culpa* in bringing you this story a bit late.

In 2010, COA member Rusty Stover entered a display she had created for the Sanibel Shell Show. She deservedly won a couple of ribbons for her efforts. Thankfully, then COA member, Ardeth Harden photographed this display and sent me the images. These pictures show a miniature 'Hall of Malacology,' complete with display cases, counter, bookcases, etc., all with very small shells. Those who attended last year's COA convention might remember Rusty Stover's informative and humorous talk on photographing micro-shells, so we know she is still interested in those small bits of calcium. Keep in mind when looking at these images that this entire display is less than 2 feet on a side and that those are real shells, small but real.









Captions seemed superfluous as these images truly do speak for themselves, but a few final thoughts seemed to be in order. First, please note that you can recognize many of the books on the bookcase. Yes, that is Peter Dance's "A Collector's Encyclopedia of Seashells," (third shelf up, far right) and his Eyewitness Handbook, "Shells," (second shelf up, far right). I leave the rest to you. They are in your bookcase, just many, many times larger. Second, I apologize again for the delay getting this out. This display needs to be seen (the *Megalodon* teeth brought a chuckle).

Tom Eichhorst

More Piggy-back Shells?

J. M. Inchaustegui

At the March 20, 2012 meeting of the Houston Malacological Society I saw on the Silent Auction table a peculiar murex labeled "*Murex* Sp." with 2 objects attached to the fronds. Even though it was a common shell, *Chicoreus brunneus* (Link, 1807), I decided to bid on it and try to outdo the other two collectors who had already bid. When the Silent Auction was finished I saw that I was the high bidder so I took it home to examine further. The two objects were little mussels attached to the shell by their light brown byssus. I tentatively identified the hitchhikers as *Septifer bilocularis* (Linnaeus, 1758), but what do I know about bivalves?

The spire of the murex is very damaged and worn, possibly caused by the bivalves rubbing against the spire while all 3 shells grew in size. The murex measures 57 mm and the bivalves 23 mm and 18 mm respectively. The mussels have a shiny, silvery blue interior. The outside colors mimic the dark brown and some cream of the *Chicoreus* making them well-camouflaged when in place. This brings to mind the little slipper shell (Crepidulidae) I found on a *Conus* that I reported previously in "Are those Mexican slippers?" in the September 2010 *American Conchologist*.

Together with the shells there was a little piece of paper that seems to have been cut from an old envelope flap. It appears to say "Allen Moleina, Gift of C. Boone, Use current ACO #." Inside the murex is the number, 1441, but there is no date or locality given. Any information on these shells or the two individuals mentioned on the slip will be greatly appreciated.

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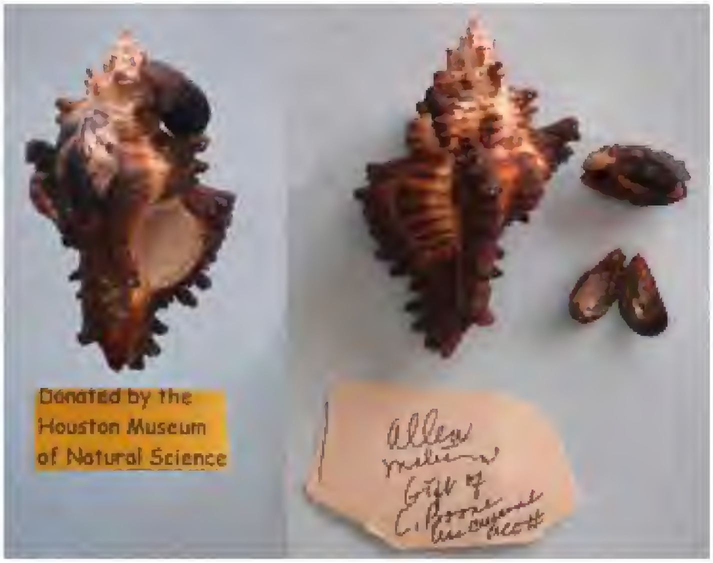

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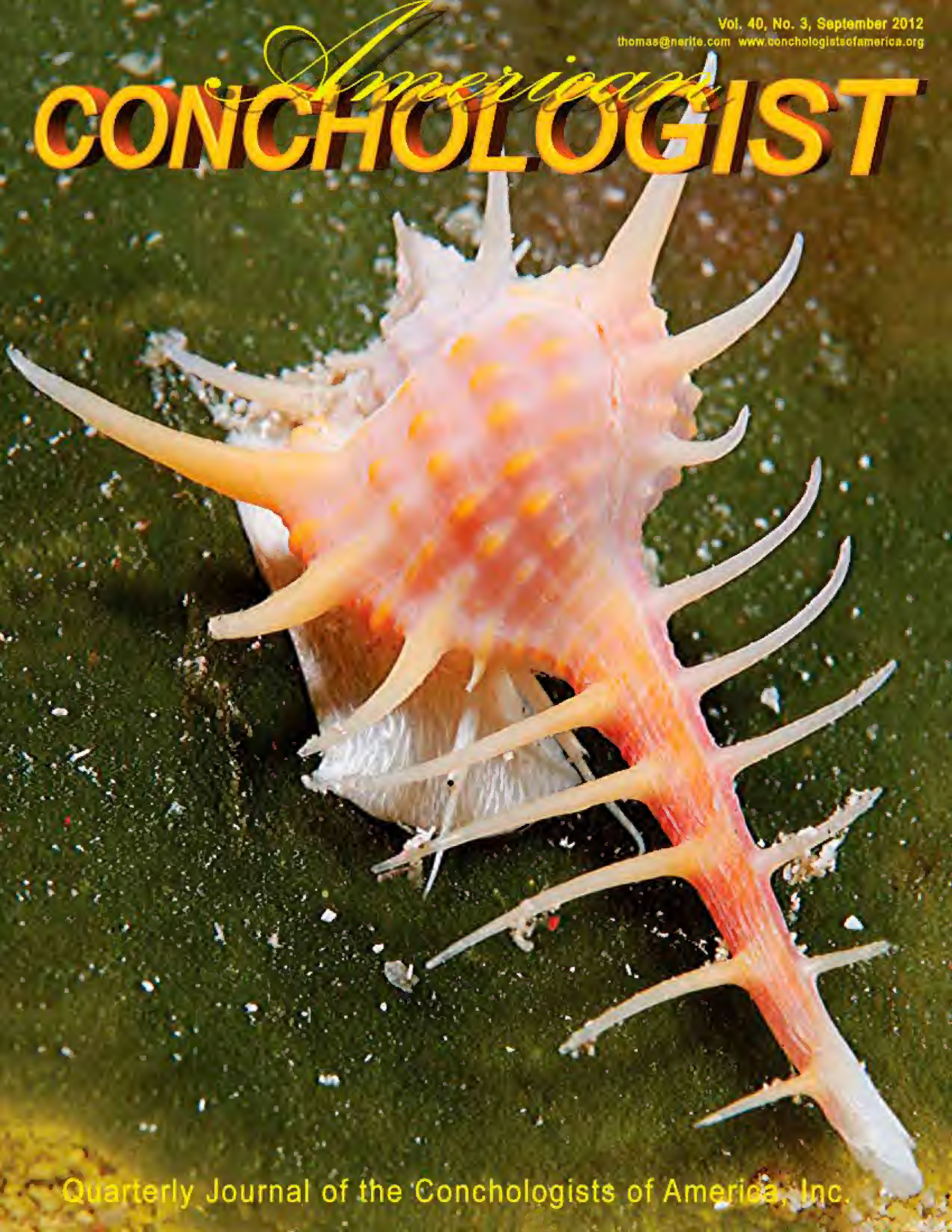

Quarterly Journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world. In 1995, COA adopted a conservation resolution: Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.

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Front Cover: *Vokesimurex cabritii* (Bernardi, 1859) is fairly widespread in the Caribbean and has long been a favorite of collectors because of its delicate coloring and graceful sculpturing. Photo by Charles Rawlings, 2012.

Back Cover: *Conus harlandi* Petuch, 1987, as found in the Utila Cays, Honduras. This form has more spiral bands and is often more brightly colored. Photo by Charles Rawlings, 2012. See more images by Charles Rawlings on page 27.

Editor's comments: I received an email from Joaquin Inchaustegui regarding his article, "More Piggy-back Shells?" in the June 2012 issue. In that article he described shells he purchased at a silent auction from the collection of C. Boone. Joaquin asked if anyone had knowledge of C. Boone. Tom Rice, from Phuket, Thailand, replied:

"Just received in Phuket the article about the 'piggy-back shells.' The C. Boone was a Houston shell collector who was very involved in the AMU and the COA and died in 1999 while on a shelling trip conducted by Emilio Garcia to Australia and was cremated and buried at sea at the request of her children because she loved the sea so much. Her shells were divided amongst the shell collectors that were on the trip with her. However, she collected in many parts of the world so I can't say where that particular shell was collected."

As usual, this issue has a variety of shell-related material. Both covers are obviously more from our doctor, lawyer, diver, nature photographer, adventurer, Charles Rawlings. This last label is because of the Humboldt squid article in the June issue. I personally would have been happy to hold the light IN THE BOAT while Charles swam at night with the Humboldts. In any case, he supplied us with some great photographs from Honduras -- both covers and page 27. A collection of his underwater photographs can be found in his book, *Living Shells* (2010).

Martin Snyder was one of this year's recipients of the *Neptunea* Award (along with Gary Rosenberg) and he provides us with an account of working as one of the team headed by Philippe Bouchet, Head of the Mollusk Division of the Paris Muséum National d'Histoire Naturelle, in their 'species count' in the waters of Guadeloupe. This ongoing worldwide project was first briefed to COA members by Philippe during the COA convention at Mobile, Alabama, in 2006. Martin Snyder provides an updated and thorough overview of the process involved in this long-term study.

Next we have a written version of a talk given by Linda and Jim Brunner in Philadelphia. While the article is titled, "Yes we can, twice," their talk was subtitled "How to write a shell book and not get divorced!" So we can all imagine that it was not necessarily an easy process.

Emily Volkes then does double duty here. First, with the front cover shell, *Vokesimurex cabritti*, a muricid genus named in her honor, and second with a short article on the present trend of splitting (maybe over-splitting) genera. Taxonomy can surely be fascinating, but sometimes it seems we forget that such labeling of the natural world was meant to help us understand the world around us and is, in the end, an artifice. An answer to the human need to make lists and put things in boxes.

Next Igor Christo Miyahira, Sonia Barbosa dos Santos, Maria Christina Dreher Mansur & Jéssica Beck Carneiro explore the present state of research into the freshwater mussels of Brazil. The problems faced by unionids in Brazil are quite similar to the problems they face in the US. As stated on the Freshwater Mollusk Conservation Society webpage (http://molluskconservation.org), "North America once had 300 species of native mussels. It was the most diverse mussel fauna on earth. Unfortunately, 38 of these species are presumed to be extinct and another 77 species are considered critically impaired. These fascinating creatures are the most gravely imperiled group of animals in the country."

We round out this issue with articles on COA Award winners, the 2012 COA - AMU Convention in Philadelphia, and a look back at the first 40 years of COA.

Thomas E. Eichhorst

The 2012 Guadeloupe Biodiversity Expedition

Martin Avery Snyder

INTRODUCTION

In the early 1980s it was estimated that there were approximately 1.5 million known plant and animal species, with possibly another 1.5 million to be discovered and named - a biodiversity of 3 million species. All this was soon to change, with the first new estimates coming from the entomologists. Within 30 years estimates had been raised to 1.9-2.0 million known species and a total number of species of 7-20 million. These new biodiversity estimates were the result of better specimen collecting techniques, new sampling protocols, and new computational extrapolation techniques.

These new ideas and methodologies quickly caught the attention and imagination of Philippe Bouchet, now Head of the Mollusk Division of the Paris Muséum National d'Histoire Naturelle (Natural History Museum) and senior professor there. He started with small Mediterranean expeditions and followed with Indo-Pacific projects. His first land-based Indo-Pacific expedition, with 18 people, was in 1993 to New Caledonia. Since then he has led numerous Indo-Pacific expeditions, the largest averaging 60 people for 7 weeks in Santo, Vanuatu. This spring he assembled a month-long expedition in May of roughly 35 people to Guadeloupe, an island in the French West Indies in the southeastern Caribbean. I was privileged to join the expedition as a Research Associate at both the Academy of Natural Sciences of Drexel University (Philadelphia) and at the Paris Museum, and as President of the Philadelphia-based Center for Molluscan Studies. This paper describes how these expeditions proceed in general and how this particular Caribbean expedition developed.

Ecologists and taxonomists sample and extrapolate differently. Ecologists consider a small area, perhaps a square meter of sea floor, and survey it extensively. Everything on and under the sea floor in this area is sampled and counted, and then extrapolations of biodiversity are made from these samples. Taxonomists collect specimens from many different areas and from different sorts of areas as well. This protocol provides a more species-rich inventory and a generally larger biodiversity estimate. In Guadeloupe we collected from shore rocks with intertidal pools, shallow rock bottoms, coral and grass beds, mangrove tree-root areas, deeper grass, coral and rock bottoms (requiring scuba diving for direct access), and low and vertical coral reefs. Most of these areas can be sampled in several different ways (as explained below) and these same sorts of areas were sampled at sites all around the region to be surveyed. In Guadeloupe, sampling was carried out to a depth of 150 m. Eventually biodiversity counts and estimates will be made by using this collected material. Bouchet's earlier Indo-Pacific expeditions made it clear that the majority of gastropod diversity occurs in smaller species, ranging from 1-5 mm. Mollusks of this size are frequently overlooked in survey work. Effectively collecting and processing this population of smaller mollusks requires new and unfamiliar techniques, as described below. First, though, some details of the Guadeloupe expedition.

The Guadeloupe expedition was a joint project of the Paris Museum and the National Park Service of Guadeloupe (Parc National de la Guadeloupe). Being joined with the park service allowed us to collect in the underwater protected park areas, the areas with the best material. The expedition personnel were roughly divided into "collectors" and "processors." The collectors are not "shell collectors" in the usual sense of buying and trading shell specimens, but rather are experienced individuals, skilled in retrieving mollusks and other marine sea creatures from their natural environment, what Bouchet refers to as "hunter-gatherers." This turns out to be pretty hard work with above-average physical demands. The processors sort the collected material (back at the 'lab' as described below) and see that each batch is properly labeled as to the 'where, when and how' of collecting (more of this later).

The expedition base site was spread around the Laboratoire de Biologie Marine of the Université des Antilles et de la Guyane, a university of more than 12,000 students. This large lab building has 18 bench stations, each equipped with a Leica Wild M3B dissecting microscope. There are also two full baths (with showers), a scuba diving area with (steel) scuba tanks and lead weights (items that are hard to bring yourself), as well as two compressors for filling tanks. The lab facilities are completed by a three-station computer and camera imaging center and a refrigerator room to store live-taken material that comes in too late to be processed that same day. There is a small dock and a boat launching ramp. The Park Service keep the scuba-diving boat they provided just down the street.

Our hotel, the Hôtel Village Soleil (at Gosier), is about a 2 km walk from the lab. We started each morning with breakfast at the hotel. Lunch and dinner were eaten collectively just down the street from the lab at a Creole restaurant, An Tol La. If the collectors were too far into the field to return for lunch, the restaurant packed a picnic lunch for them. A typical day's schedule was:

6:30 AM -	breakfast at the hotel by the pool (a pool we will never use)
7:15 AM -	at the lab – collectors depart to the field and processors start
12:00 PM -	lunch at An Tol La
1:00 PM -	collectors depart for afternoon locales (if they have returned)
7:00 PM -	dinner at An Tol La
8:00 PM -	return to the lab to complete the processing of that day's material, clean up and stow outdoor equipment (and one boat) inside the lab for the night
10:30-12:00 -	close the lab for the day and return to the hotel

The purpose of an expedition of this sort is threefold. First, by so thoroughly sampling the local fauna of the island we can get valuable biodiversity estimates. It will be particularly interesting to compare the diversities of the Caribbean and the Indo-Pacific. Preliminary information will be available in about a year's time. More complete information will take a few more years to develop. Second, although local fish and coral populations have been thoroughly catalogued, not nearly as much is known about molluscan and general invertebrate populations. The Guadeloupe

Park Service is very interested in a baseline inventory of the species inhabiting the coastal waters around the island. In line with specialized interests of some expedition members we also collected echinoderms (starfish, sea urchins and the like), crustaceans (crabs), and red and brown algae. Finally, taxonomists are always interested in describing new species. Bouchet and his group are also building a significant database of DNA sequences of mollusks. This expedition yielded more than 5500 lots (single or multiple specimens) for sequencing.

Our expedition group came from a wide range of backgrounds. Some were professional malacologists, both active and retired. About half were marine biologists of one sort or another. One was a French policeman, another a procurement officer for the French nuclear submarine fleet. Two were retired school teachers who now volunteer with Bouchet's Paris group three days a week. There were also a few students and several professional divers. Each had been invited because he or she would best deal with a particular anticipated task.

COLLECTING

In Guadeloupe we employed six collecting techniques. Each is designated by the first letter of the corresponding (French) descriptive words. These letters become part of the collecting site reference keys (to be explained below):

M – "maréeur" (shallow water shore collecting)
N – "nasses" (trapping)
R – "récolte à vue" (hand-picked by scuba diving)
B – "brossage" (brushing and screening)
S – "suceuse" (vacuuming)
D – "drague" (dredging)

Some of Bouchet's expeditions use tangle-net collecting and we describe that technique as well. The first three methods above collect individual specimens. The last three are bulk sampling methods that require special processing protocols.

M: Shallow water shore collecting is pretty much as its name implies, but not quite so easy as it sounds. This is "mask, fins, and snorkel" territory. First one must get to the shore, often a rocky area with no simple access. The first such site I visited was accessed through a large graveyard and then across a communal trash dump. The collector then climbs down into the shore rocks and surf and starts looking for specimens. Rocks that will move are turned over to see what is living beneath (and then replaced in their original position). One then works out into shallow water, to about 2 m, snorkel diving to the bottom to go through the same exercise. To collect starfish or crabs one has to move quickly since they scuttle away as soon as they are exposed. Some brushing (see below) is also done in shallow areas.

N: Trapping can be done in a number of different ways. This is an ancient collecting method, and we used a clever version developed in 1984 by Dominique Lamy of Guadeloupe and fine-tuned over the last 28 years. With these traps he has collected as deep as 600 m and discovered a number of new species.

Each trap is made from two 1.5 liter plastic water bottles, which we will refer to as the upper and lower bottles. First the bottom of the upper bottle is cut off. The lower bottle has both the bottom and the neck (down past the cap threads to where the bottle begins to flare) cut off. The remainder of the sloping part of the lower bottle is sliced to form about 10 "petals." The lower bottle is then pushed up into the upper bottle with an overlap of about 4 cm. The grooves incised in the bottles during manufacture serve to lock them together; now you have a trap! Creatures enter the bottom, expand the slit "petals," and push through to the bait in the upper bottle. They cannot reverse the process to escape, but with a twist the two bottles come apart and the trap can be emptied and readied for re-use.

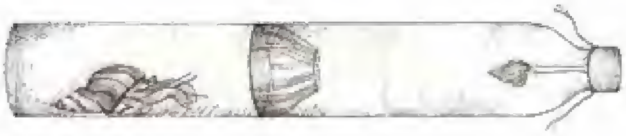


Fig. 1 Individual bottle trap.

Bait is usually a piece of fish impaled on a wire and wrapped in tissue to avoid having it eaten too quickly by crabs. The bait can be renewed and the trap reused.

In Guadeloupe, 35 traps were set on each line and up to four lines a day were employed. A three kilo weight is attached to the end of the trap and the individual traps are tied onto the rope by two metal wires, roughly every 5 m. Each trap has a small weight affixed to the outside. After the last trap, a 12 kilo weight is put on the rope to hold the traps in place. A long rope is attached and run to a buoy or float on the surface. The traps are left in place for roughly 12 hours from dusk to dawn. Setting and retrieving the traps is a three-man operation. Retrieval is accomplished with the aid of a gasoline-powered winch, temporarily mounted on the boat for this purpose.

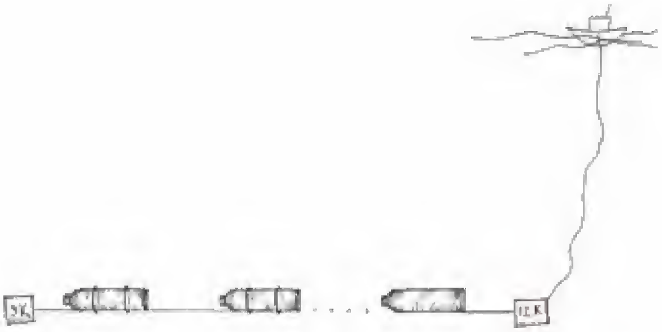


Fig. 2 Trap line configuration.

R: Scuba diving is used to collect individual specimens, in what is referred to as "targeted collecting." It is also required to implement brushing and vacuuming, as discussed next. Diving is good for fair-sized, widely separated specimens, not usually acquired by bulk collecting methods. Diving in any professional context in France requires a special professional license. This is a serious affair requiring, among other things, a complete annual physical exam costing about 500 euros. Only a few of us on this expedition held this license and the expedition had been adjudged a "professional" enterprise. Fortunately, the Guadeloupe Park Service accommodated, letting us dive so long as each unlicensed diver had a "buddy." I was paired with Michael Tillman, a most pleasant, experienced diver who proved to be very knowledgeable about local conditions.

Each morning we set up and loaded our equipment, taking a small boat or truck to the dive boat. When we moved to the west coast we started with a 1-1/2 hour car ride to the boat, which had been previously moved there. To keep live collected material from the west coast fresh, there was a midday shuttle each day back to the lab. There were one or two dives in the morning and another after lunch. We then headed back to the lab, washed and stowed our equipment, and brought our catch into the lab. All the collected material was spread out in shallow trays and covered with sea water to keep live animals alive. Each such tray was labeled GR (G for the Guadeloupe expedition and R for collected by diving) with an appended number for the particular dive. This information was all stored in a data bank. For example:

"GR08" was our 8th dive, made on May 5 in the afternoon, on an underwater cliff face in the Petit Cul de Sac Marin (16°09'34.6"N, 61°32'43"W). The bottom was at 22 m.

In addition to smaller individual specimens we collected large "showy" *Chicoreus*, *Strombus*, *Cassis*, and a lovely large *Charonia variegata*. As we became familiar with the fauna we would pass up species already adequately represented in our collected material. Many of these mollusks are hard to see in their natural environment and they are never really plentiful. As time passed, the divers became increasingly adept at discovering more species.

B: The first of the bulk collecting methods, suitable for collection of the many smaller species, is brushing and screening, devised by Bouchet on a 1993 expedition to New Caledonia. We use plastic laundry baskets purchased in Taiwan. They measure about 70 cm x 45 cm, 35 cm deep, with holes of about 1 x 1.75 cm. The baskets are manufactured with a peripheral ledge set so that when one basket is placed in another the two bottoms are held about 12 cm apart. The idea is to collect all the sea life attached to (movable) rocks and dead corals by brushing it off with nylon brushes. Of course, one has to collect and retain this material.

Fig. 3 Brushing and screening.

The apparatus consists of a pair of laundry baskets, set one inside the other (but held 12 cm apart by the ledge as mentioned above) with a sheet of very fine mesh sandwiched between them. The upper basket has four lead diving weights wired to the bottom (about 10 kilos) and two scrub brushes attached by rope so they will not float away. Two or three divers operate the system. One or two divers collect the stones and dead corals and place them in the basket. The other(s) brush the surfaces of these objects and discard them when "clean." This procedure can also be used on the underside of overhangs or on cave ceilings.

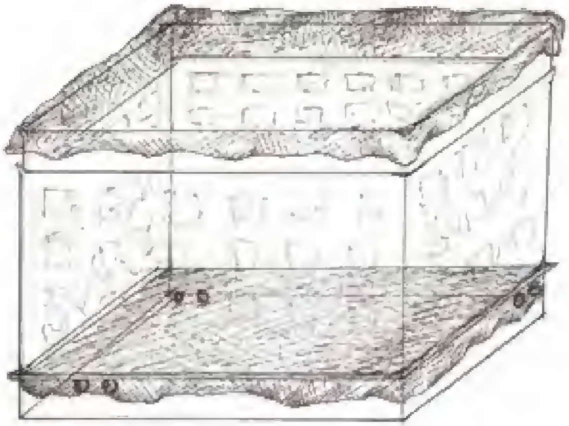


Fig. 4. Brushing and screening laundry baskets.

When the collecting dive is complete, the upper basket is covered with another layer of mesh, attached with bungee cords. A lift balloon is attached to the apparatus and filled with air from a scuba tank, bringing everything to the surface. In the 2-5 liters residue, as many as 40 different species can be recovered.

S: Vacuuming for mollusks is a method adopted and adapted from other disciplines; Bouchet has been using this technique since 1982. This is another three-diver operation, often the same group doing brushing and screening. The vacuum is a homemade device consisting of about 2 m of 3" PVC pipe with a 7 bar (about 100 psi) compressed air connection about 15 cm up from the substrate. Air is supplied from a separate pair of twin-yoked

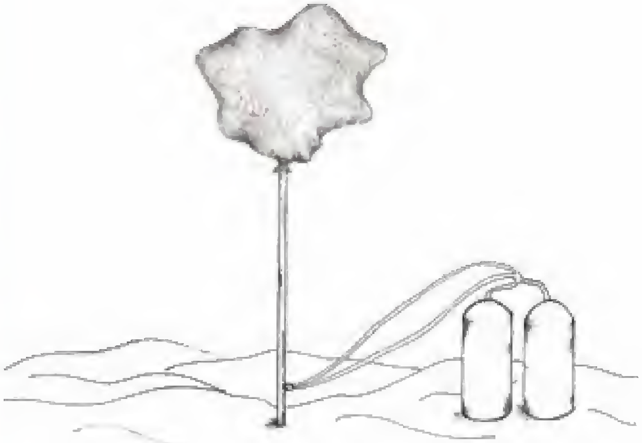


Fig. 5 Vacuum arrangement.

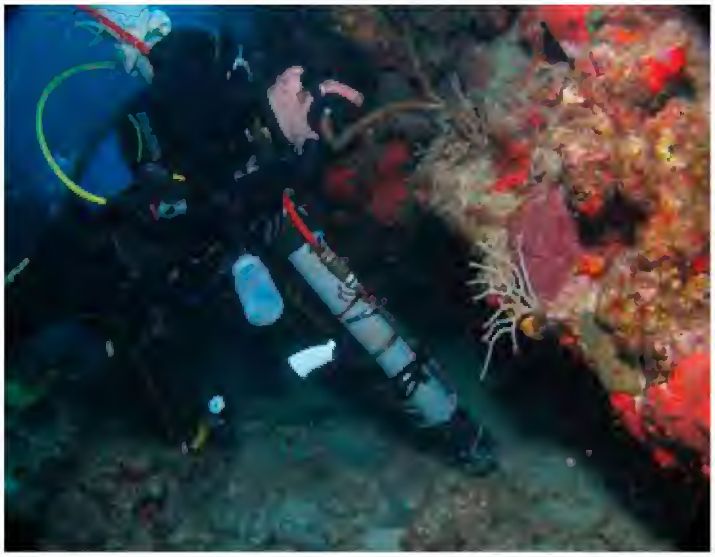
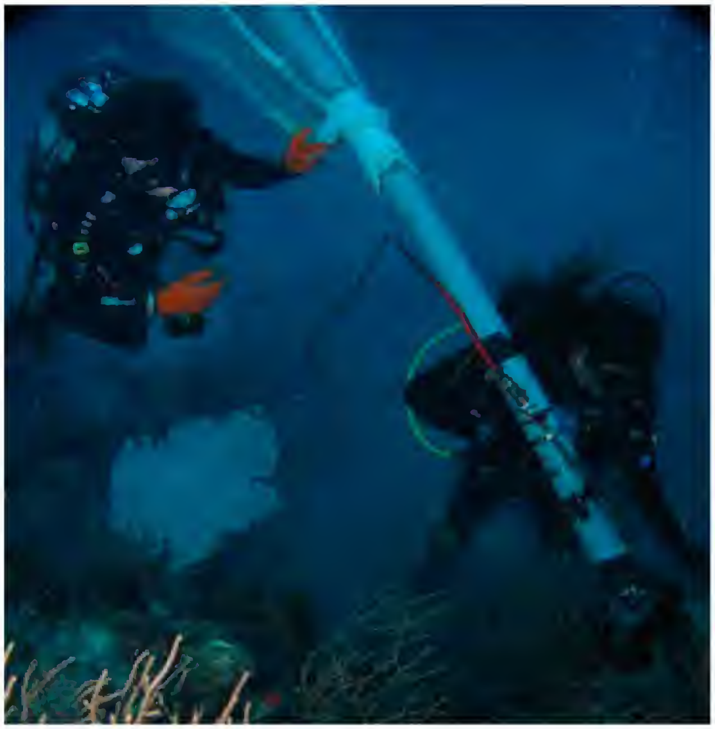


Fig. 6 Vacuuming at work.



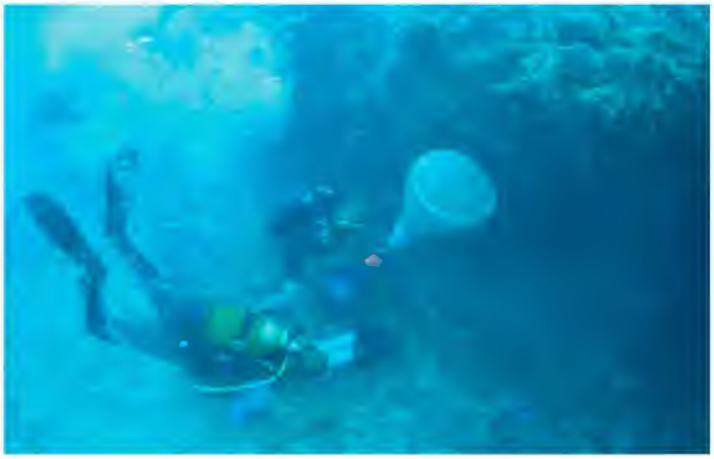


Fig. 7 (above) & 8 (below) Vacuuming with collection bag.

scuba tanks, used consecutively. The valve is opened and the air rushes into and up the pipe, expanding rapidly and creating a powerful partial vacuum in the last 15 cm of pipe (nearest the bottom). The equipment works most easily over a hard bottom where it cannot "dig in," but also works well over a sand or mud substrate if the bottom of the vacuum is held a few centimeters above the sea floor. One diver turns the air on and off, and the other two control the vacuum. To collect the vacuumed material the top of the pipe is covered with a fine mesh sack. This sack can be disconnected and fitted with a lift balloon, if desired. With deeper water mixed-gas diving (trimix used to about 100 m) the compressed air from scuba tanks would empty very quickly, so a small waterproof electric pump is employed instead to power the vacuum. Finally, brushing and vacuuming can be combined by brushing the sea floor and then vacuuming the surrounding area.

D: Dredging is a common bulk-sampling collecting technique. Equipment ranges from one-man rigs (as used in Guadeloupe) to large deep-sea equipment. Success is dependent on design as well as bottom type and topography. Obviously a large rock can stop a small dredge very quickly. For this expedition Bouchet arranged for a talented commercial diver and amateur dredger, José Rosado, whom he met on an earlier expedition, to bring his equipment from Maputo, Mozambique. The dredge consists of a stainless steel framework covered with nylon mesh to catch the material raised from the sea floor. The trick is to scrape 2-3 cm of the sea floor, enough to sample the sea life but not so much as to slow or stop the dredge. The size and angle of the cutting blade is critical. Rosado has added a heavy chain in front of the blade which apparently "pre-disturbs" the bottom, with very successful results.

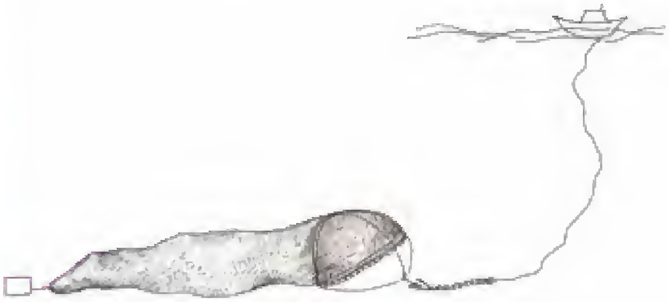


Fig. 9 (above) Dredge configuration.
Fig. 10 (below) Typical sea floor.

A typical dredge haul takes 20-30 minutes and this dredge can work down to about 200 m. José attaches a heavy 6 m chain to the front of the dredge and then the tow rope is attached to that chain. At greater depths he adds another 4 m of chain to hold the blade down on the bottom. He devised a one-man retrieval method where the boat pulls the rope up through a ring in a surface buoy, a method more efficient than the usual winch-assisted recovery.

P: (from the Philippine word *pamo* for tangle nets) One other collecting technique, not used in Guadeloupe, is tangle nets. These nets work effectively on the sea floor, beyond the depth of scuba divers and on deep reef and shelf slopes or near vertical surfaces where trawling or dredging is not possible. The nets are approximately 40 m x 3 m fishing nets with more or less standard ~ 15 cm mesh. They are set in layers of perhaps 3 such nets, left overnight, and then retrieved. This is a very tricky and time-consuming business, especially the removal of the mollusks and other (typically branched) materials trapped between the nets. The most experienced operators are in the Philippines. For his upcoming 6-week Papua New Guinea expedition, Bouchet plans to bring an experienced Philippine fisherman with 40 nets.

PROCESSING

It is important to note that the collecting work is 'task-oriented.' The same divers look for individual specimens each day (R) or run the vacuum (S) or do the brushing and screening (B), and so on for the other collectors. This sort of task specialization (rather than just working with fasciolariids, for example) leads to efficiency and expertise. At the end of the expedition there is just one resulting collection consisting of all the collected materials and this is what permits biodiversity estimates. Individual collecting of particular items precludes the necessary overviews. This same task-oriented approach is followed with the processing of the collected materials.

Preliminary processing of all the collected materials is done at the expedition laboratory. The objective is to sort through all the collected items, setting aside the specimens worth photographing and ultimately selecting specimens for DNA sequencing ('barcoding'). It is important to try to process all the materials on the same day they are collected, while the animals are still fresh and can be suitably preserved for barcoding. To accomplish all this Bouchet sets up and oversees an 'assembly line' procedure.

It turns out to be quite difficult to sort small material of uneven sizes. For this reason the bulk material is passed through a series of 5 sieves to produce samples of more uniformly-sized specimens that will be easier to deal with. This procedure was carried out on the boat ramp using a seawater pump to wash the bulk material through the sequence of sieves. Two sets of stainless steel sieves are used, each with mesh sizes ranging from 5 mm down to .5 mm. These sieves are brought from Paris, with the larger set costing 1500 Euros. They measure 46 cm in diameter and 10 cm deep. The smaller set, for small samples, is 26 cm in diameter and 6 cm deep.

After this preliminary separation by size, the next step is to sort the shells from other non-molluscan 'debris,' a truly arduous task. If 50% of the expedition is associated with collecting material, just 10% of the total effort is devoted to size sorting (sieving) and the balance goes to sorting out and processing the mollusks themselves. A simple flow chart will illustrate these first steps of processing the collected materials:

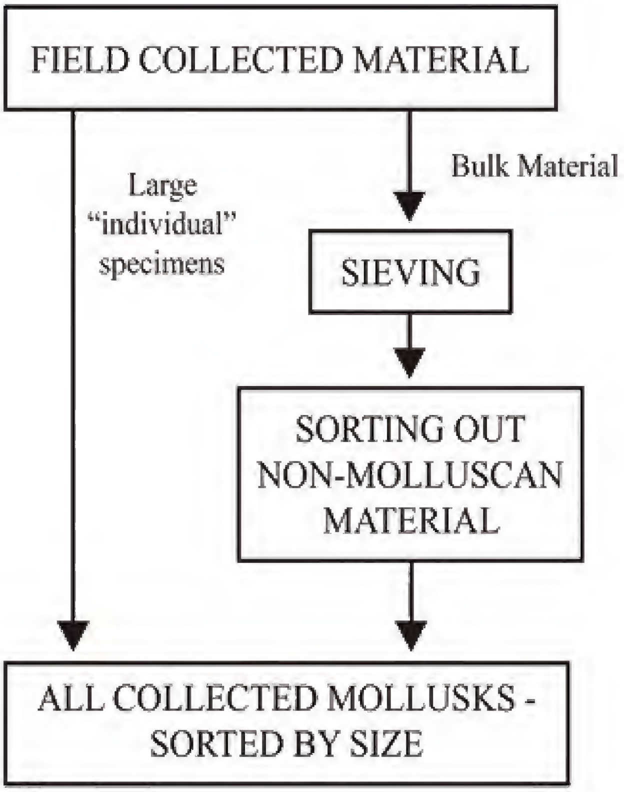

FIELD COLLECTED MATERIAL
Large "individual" specimens
Bulk Material
SIEVING
SORTING OUT NON-MOLLUSCAN MATERIAL
ALL COLLECTED MOLLUSKS - SORTED BY SIZE

Fig. 11 Flow chart of specimen processing.

Because of the very small size of most of the bulk material, it must be tediously sorted using microscopes.

The next steps in material processing are no longer linear and involve more 'judgement calls.' Philippe Bouchet and Philippe Maestrati (Paris Museum) look through the material to select 'photoworthy' specimens. These include specimens where the animal displays itself particularly well, 'unusual' specimens and possible (alive) new species. Other persons further along the line can suggest specimens for photography as well. Each photographed animal is given a 'photo tag,' which indicates which of the three computer imaging systems was used and the designation of the stored image. For example, the photo tag **GB09-B-PM0281** is the image #PM0281, taken with camera B, of the epitoniid speci-

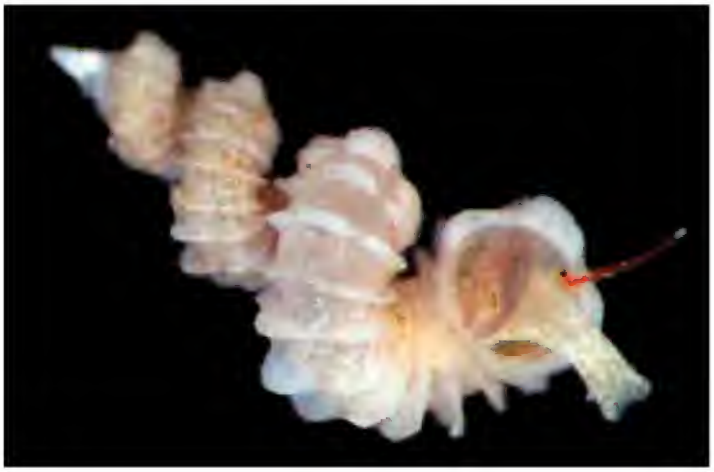


Fig. 12 Unidentified epitoniid GB09-BC2297-B-PM0281.

men shown here. As usual, GB09 is the collecting site, in this case material collected on May 10 by brushing at 6 m deep in the Baie de Bouillante on the west coast of the western island of Guadeloupe, Basse Terre, (16°8'4.1"N, 61°46'42.6"W).

All specimens that are photographed are then processed for barcoding (genetic sequencing). Of course, unphotographed specimens may also be processed for barcoding.

There are many genes that can be sequenced in any organism and different genes are used to differentiate specific properties. The modern methods of genetic sequencing started in 2003 with a seminal paper by Paul Herbert, a Canadian entomologist. His idea, which works for most gastropods, is to sequence just a short segment of the COI gene (coding for subunit 1 of the enzyme cytochrome c oxidase). This is a maternally inherited mitochondrial gene (mtDNA) that has a relatively fast mutation rate, resulting in significant differences between species. Before 2003 genetic sequencing required difficult and expensive procedures. After 2003 most gastropods could be fixed in ethanol (alcohol) and sequencing became a relatively inexpensive everyday technique. Herbert called this particular genetic sequencing 'barcoding' in analogy with commercial product coding techniques.

Bouchet started developing his barcoding protocol on the 2004 Panglao Island (Philippines) expedition. During material processing, a barcode number, BC *, is added to the site designation for each specimen to be sequenced, and this label is then kept with both the animal and shell in case they are separated. Crustaceans, echinoderms, and the like are easy to prepare for sequencing (just put the specimen in alcohol). Mollusks are more difficult: bivalves close up tight and gastropods retract into their shells. Just soaking these specimens in alcohol will often not properly preserve the material for sequencing. For gastropods, one used to place the shell and animal in a solution of magnesium chloride and relaxation (and animal removal) would eventually follow. In 2011 Hugh Morrison of Perth, Australia, recommended to Bouchet using a microwave oven to relax the columellar muscle and permit removal of the animal from the shell. Usually 20 seconds will suffice; the exact time depends on the size and thickness of the shell. This technique has allowed the preparation of roughly three times as many specimens for barcoding. In Guadeloupe the barcoding preparation group of three was led by Ellen Strong of the Smithsonian and Nicolas Puillandre, a postdoc in Bouchet's lab.

The first 'lab step' with the bulk material, after it is sorted for size, is to separate live from dead material. This usually requires the aid of a microscope, all the while continuing to look for photo-worthy specimens and sort out material to be barcoded. This is a bit complicated since (except in particular circumstances) we could not afford to sequence more than a few examples of the same species. In consequence, we had to keep track of what had already been selected for barcoding (other than by the data base records). The dead shells also have to be treated with care and here the lead person was Virginie Héros of the Paris Museum. Any one of these dead shells could prove to be the only specimen collected of a certain species, or could even represent a species new to science. Bouchet oversees this whole operation and applies his judgment and experience.

After separating the animal from its shell, a barcoding number is attached and the animal is preserved in 95% ethanol for sequencing.

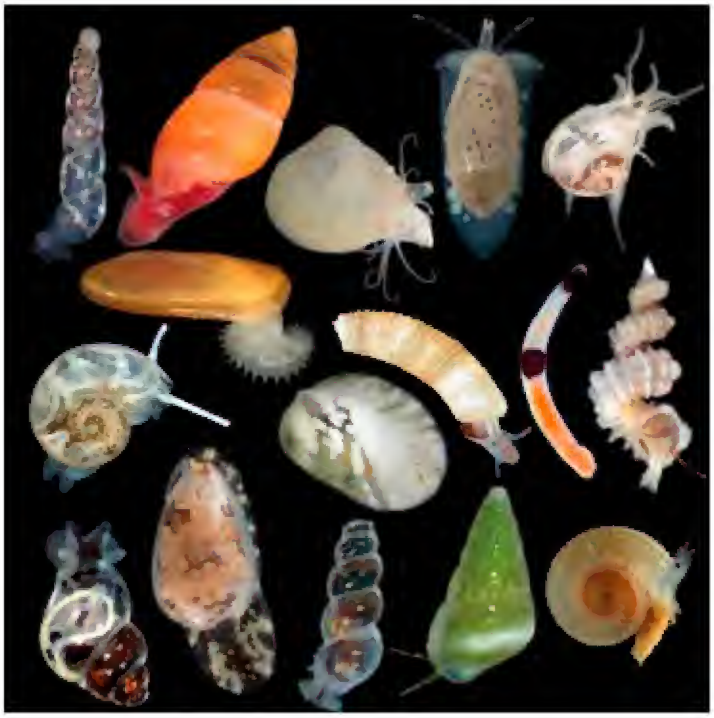


Fig. 13 Micromollusk sampling.

Other live-collected material (not to be barcoded) and dead shells are bulk packed in 80% alcohol, separated by site and size, and simply labeled with the G * site label. As this procedure is completed, material processed for barcoding and separately bulk dead and live-collected material is packed in special UN standard plastic-lined cylindrical steel drums (about 35 cm in diameter and 58 cm high). Thirty of these drums were brought from Paris for the Guadeloupe expedition. We estimated that 100,000-200,000 specimens were shipped back to the Paris Museum. Bouchet also brought four plastic shipping containers (120 cm x 80 cm, 80 cm tall plus 14 cm legs) to carry supplies and equipment back and forth.

Guadeloupe was a fairly simple exercise since it is part of France and hence a fair bit of regulatory 'red tape' could be made easy for the Paris Museum. France has a law forbidding the collecting of marine life by scuba diving, and this required a special waiver to circumvent. The Park Service and the University provided dive boats, and lab facilities and equipment. For expeditions such as the upcoming one to Papua New Guinea, Bouchet has two seagoing containers (one 20' long and the other 40'), his own scuba tanks, and two air compressors to fill them, all of which he will take with him.

THE WRAP UP

At this point the photographic images are complete and in a database, all collected material is labeled with full details of its collecting site, the bulk material is sorted by size, and material to be DNA sequenced (barcoded) is preserved and labeled. The collection of roughly 1200-1500 mollusk species is on its way back to the Paris Museum. There is still much to be done and many additional personnel will take part.

The next step, in Paris, is what Bouchet refers to as 'second tier sorting.' In this step the material is rinsed and sorted to at least the family level. Full labels are printed for each Guadeloupe collecting site. All the bulk material from each station is rinsed and dried. Some 10-12 people (several from the expedition and some others) will now spend 2-3 weeks in the winter, with this material, at a hydrobiological station in central France ('the monastery'). This station is not otherwise used in the winter. It has ground-floor lab space where the material can be sorted and rooms above where the personnel stay. All the different size classes from each collecting station are sorted to family (or lower) level and repackaged, by family, with the fully explicit pre-printed labels. These sorted materials are then returned to Paris.

Some groups Bouchet deals with 'in house,' often with the help of his students. He also deals with the 'orphan taxa,' groups for which there is no acknowledged expert. For other groups Bouchet has assembled a network of expert taxonomists. Classical shell-based taxonomy proceeds in two steps. First groups of similar specimens are assembled: so-called 'morpho-species.' At this point these 'species' do not have names. Probably any professional malacologist can take this first step and estimate the number of different species. This is just the sort of count needed for a biodiversity estimate. The second step requires an expert who knows the names of these species, or if they are newly discovered and need to be described. This second step, which usually does not change the species count, typically starts 1-1.5 years after an expedition and is an open-ended process with taxonomic papers still being generated 20, 50, or more years after an expedition. Most families of mollusks simply do not currently have an expert working on them. This is also a role of museums to archive unstudied material until better taxonomic times come.

Material to be barcoded is usually treated separately, in Paris. The material delivered in the drums is more or less in the order in which it was collected and processed, and should already be labeled to the family level. This material is often farmed out to specialists working on the phylogeny of the various families. The 'rules' are that there is no 'cherry picking' – the specialist must sequence all the material prepared in a particular family. When the results are published, an expedition member who did some of the preliminary processing work will be a coauthor of the paper. This has worked pretty well, except that analysis of the micromollusks is lagging.

The genetic information garnered from these materials permits re-evaluation of families and genera, the refinement of classification at the species level, and conclusions regarding global phylogeny. Molecular science is changing the long-held views based solely on shell-based morphological taxonomy.

APPRAISAL

Did we have fun? Well…There is no doubt at all that these expeditions are hard work. The collecting is physically difficult and the lab hours are long, however it is FUN. What a great diverse group of interesting people Bouchet assembles for these expeditions. How much there is to learn.

For those who are interested in learning more about these expeditions and the science involved, there are a number of relevant papers listed in the references. Tune in a few years from now to see just what the Guadeloupe expedition accomplished.

ACKNOWLEDGEMENTS

Many thanks to Philippe Bouchet (MNHN) and Paul Callomon (ANSP) for careful critical readings of this paper and helpful suggestions which improved it significantly. Figures 1-6 were drawn by Sarina Snyder. Photograph credits are: 3, 6, 7 - Jose Utge; 8 & 10 - Yanis Turpin; 12 - Philippe Maestrati; and 13 - Philippe Maestrati & Manuel Caballer.

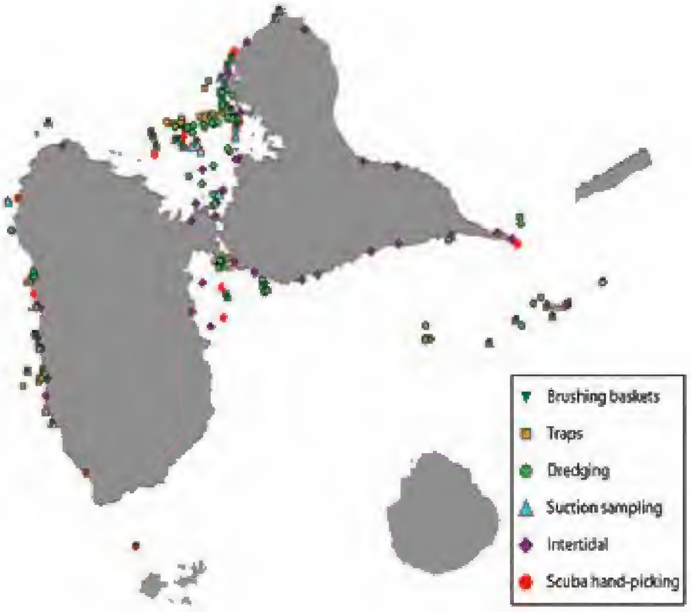


Fig. 14 Collecting sites around Guadeloupe.

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Yes we can, twice

Linda Brunner

Sometime in the 1980s the newly formed **Gulf Coast Shell Club** decided to publish a book (booklet) on local shells. We were new to shelling and publishing was a foreign language. Several members underwrote the costs of publishing to be repaid when the books were sold. There was one exception. A member who had a dive business underwrote 1000 copies that he planned to sell in his business. This was a gift to the club as the more books you order, the lower the price; volume is your friend.

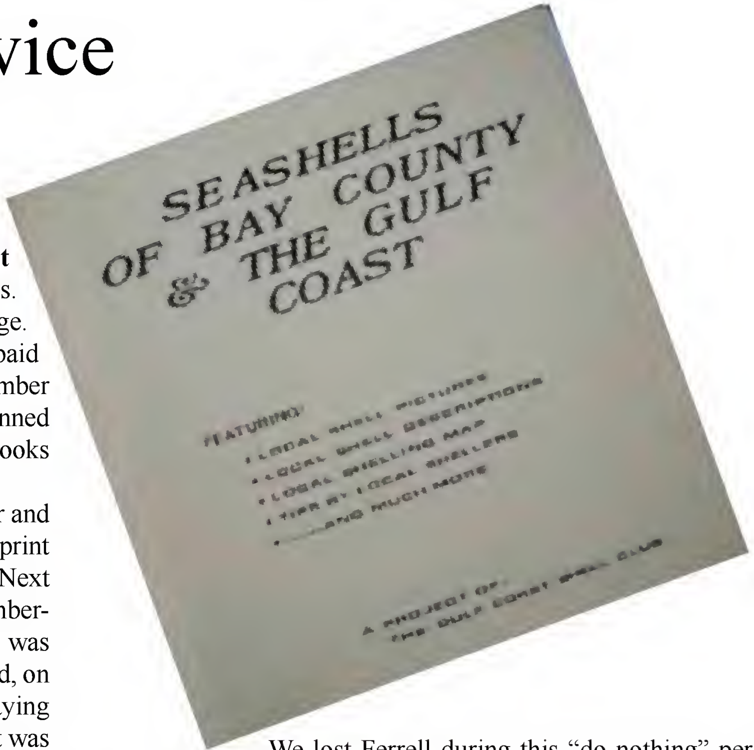
The first order of business was to search out a printer and determine what had to be done to have the manuscript in print form. Having this list, we set about gathering information. Next on our agenda was to decide what shells to include. With membership input, we decided on 95 local specimens. The next step was to have them photographed. We hired a local photographer and, on a hot summer day, Jim and I worked with the photographer laying out each page of photographs. We did this outside as the light was better on his patio than in his studio. We stuck to a phylogenetic arrangement of the chosen specimens. Then a number was added to each shell in the photograph. Remember those rub-on letters and numbers? Yep, that was our high tech system.

Now came the text and maps. With the first section of the book being photos (black and white), the next part contained names (keyed to the numbered photographs), a brief description, and location data. We then added maps of our favorite local shelling areas. This letter sized (8.5 x 11 inches) book was entitled **Seashells of Bay County and the Gulf Coast**.

In order to keep costs as low as possible we then had a collating party. We have a long somewhat narrow dining table. On the table we placed each stack of printed pages in the order in which they would be assembled. Club members gathered one Friday evening and began circling the table collating books. The printer let us borrow his electric stapler. Once a book was assembled, it was stapled. We had a folding committee who folded and creased each book. The next step was to return the machine and collated books to the printer. He trimmed the books and we began the task of marketing.

Fifteen years later we still had a few books. Several factors were responsible for this. First, we were shellers, not sellers. Second, though the book was well executed, the public wanted color. Last, the book, although it was the best we could do at the time, was awkward to use as pictures and descriptions were not together. Each shell was numbered and that number corresponded to a description in another section of the book.

Our club waxed and waned but was always enthusiastic about shells and shelling. Along came new members, Ferrell and Gwen Lawrence. We had discussed doing another book in color, but we would have to retake many slides and spend a lot of money we didn't have to successfully publish a new book in color. As a result, despite constant prodding by Ferrell we dug in our heels and did nothing. Then, along came digital photography and affordable prices and the desire was rekindled.



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- TIPS BY LOCAL SHELLERS
- …AND MUCH MORE

A PROJECT OF:
THE GULF COAST SHELL CLUB

We lost Ferrell during this "do nothing" period but Gwen was still there prodding at every opportunity. So, in 2009 we agreed to meet to discuss a book. Several factors soon became evident. Those who came to the meeting were ready to"get 'er done." They were so ready that three members agreed to put up the front money with the club chipping in $500. The next hurdle was, again, which shells do we include in the book. We decided to use the original 95 from the first book and add others as space permitted. The final product has 203 different species. Then there was arrangement. It was decided to stay with a phylogenetic order. As this book was being designed with the tourist in mind we decided to place the common name first, but to include scientific name and author so other collectors might also find the book useful.

With the basics decided we began searching for a publisher/printer. We had several samples. Many were outlandish! I had a friend from work who did some printing on the side. I contacted her and we agreed to her program. I had the computer program the printer required so the greatest expense appeared to be the purchase of a digital camera to do the close photos of micros. As luck would have it my friend said, "I have a new camera and I'll be glad to help with the pictures." Little did she know that our shell book would take over a sizeable bite of her retirement time. The bottom line was we both learned much additional information about photography and layout that we would not have learned on our own.

Over the years my friend and I had a thing about our computers. I would get a new computer and she would get one like it or, she would get a new program and I would get one too. To use the layout program in a timely manner I purchased a new computer. She soon followed suit or was it vice versa? In any event she discovered that she could connect her camera to the computer and do the photos that way. It was much easier to get the focus and color correct on a large screen than on the view finder of a camera. I would take her a box of shells and she would take the pictures and send them to me electronically. I would accept them

or ask for retakes. If I had a glitch with the layout program I could put it in "Dropbox" (a free file sharing program), she would correct it and return it to me. She had used the "InDesign" program longer than I and knew more of the ins and outs of successful operation.

While she did shell photos, we went out and did scenes and live photography. We also called on members to send photos they had taken while diving or shelling. We made our selections and asked the owners of the photos we used to sign a disclaimer for use of their pictures. We made sure to give credit to each photographer.

We were finally ready to turn the book over to the printer and the day before the appointed time my server went down. The company came through and I was up and running before the appointed hour. When we asked about shipping charges we were astonished. The printer wanted $600. Then we asked where the printer was located. We were amazed to learn that the company was about 1 mile from our daughter's home in Roswell, Georgia. Great, we could drive up in the truck and get the books and, better still, we could store those we could not transport at this time at our daughter's home. The only hitch in this was that the truck, having been neglected, needed major servicing. So, $620 poorer, we headed to Atlanta to get the books. Our grandson helped load and unload and we headed home with 1000 copies. Our first stop was at my friend's where we presented her with the first copy and much thanks for her help (the club also expressed their gratitude in a more substantial way).

Any club can do this. We had 3,800 copies printed and we have a healthy treasury as a result. As stated earlier, we are shellers not sellers, but many of our club members are both and through their dedication and hard work we are thriving.

Linda Brunner
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Ratio of species to genus-group in the Muricidae or, are we cutting things too fine?

Emily H. Vokes

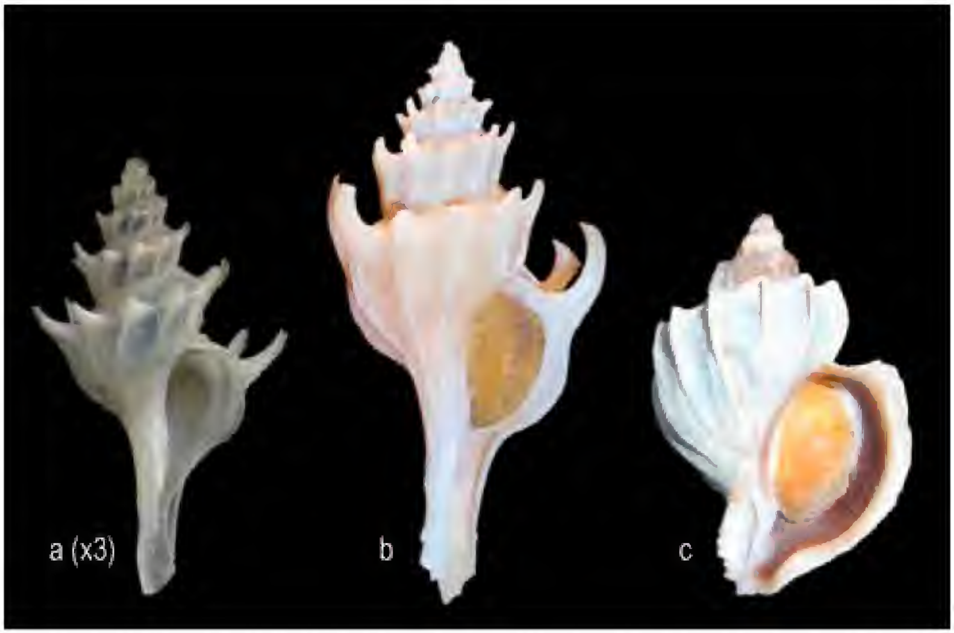
For many years I have attempted to keep current a manuscript catalog of the species of Muricidae. Since my retirement in 1996 this has become more difficult, as I no longer have access to much of the current literature. However, my dear friend and colleague Roland Houart has done his best to keep me apprised of new publications, for which I am truly grateful. The most recent work he sent me is the impetus for this study.

For years muricid workers have recognized that the subfamily Trophoninae is undoubtedly polyphyletic, but none of us knew exactly what to do about it. Now Houart has been a part of an attempt to address the problem using DNA, in a paper entitled: "Cenozoic evolution of Muricidae (Mollusca, Neogastropoda) in the Southern Ocean, with the description of a new subfamily" by Barco, Schiaparelli, Houart, and Oliverio. In this work they divided up what used to be called 'Trophoninae' into two subfamilies: Trophoninae and a new subfamily Pagodulinae. The bulk of the species have gone into the new Pagodulinae (179) leaving Trophoninae with only 80 species, plus another 18 that they could not place, lacking enough information.

It is not the purpose of my study to elaborate on Barco *et al.* On the basis of what they have shown I am in complete agreement with their taxonomy. But the data they present caused me to have to revise my Muricidae catalog. In doing so I was once again struck by the increasing numbers of monotypic (or nearly so) genus-groups. I use the term 'genus-group' in order not to have to make a value judgment of whether a particular taxon is a genus or a subgenus. In the numbers below all are considered equal.

For my own edification I made a count of the number of species in each group and, to my surprise, although there were indeed lots of small groups, there were a surprising number of large groups -- the largest of all being *Triplex* with 59 species. Having satisfied my own curiosity I thought no more about it until by chance I was re-reading Gavin de Beer's "Charles Darwin - A Scientific Biography." He discusses the many lines of investigation that Darwin pursued over the years, gathering facts to document his theory of natural selection. One of these, he states, is the size of the population in which variation takes place most extensively. From the information Darwin assembled he concluded that variability was greater in species belonging to genera with many species. It seems to be a case of 'those who has, gets.'

I will not go into Darwin's conclusions any further, except to say that it caused me to look more closely at the numbers I had derived. Indeed, there are a fair number of genera with five or fewer species, but surprisingly there is also a large number with more than ten species. In fact, in the entire Family Muricidae there are a total of 1335 species divided into 176 genus-groups, for an average of 7.6 species in each. (My numbers differ somewhat from what one will find in WoRMS [World Register of Marine Species, http://www.marinespecies.org/], due to minor differences of opinion.)



Some representative species in the 'Trophoninae' split: a. *Pagodula echinata* (Kiener, 1840) 8mm, b. *Pagodula fraseri* (Knudsen, 1956) 44mm, & c. *Trophon geversianus* (Pallas, 1774) 33mm. The *P. echinata* is as illustrated on WoRMS (www.marinespecies.org) and in *Molluscos Marinos de Andalucia* **(2011), edited by Serge Gofas, Diego Moreno, and Carmen Salas Universidad de Málaga, Spain (used with permission).**

In terms of total number of species there are:
Muricinae - 381
Muricopsinae - 235
Pagodulinae - 179
Rapaninae - 142
Ocenebrinae -120
Ergalataxinae - 96
Trophoninae - 80
Typhinae (incl. Tripterotyphinae) - 70
'Misc. undecided' - 18
Haustrinae - 14

For genus-groups with more than ten species, the numbers are:
Muricinae - 9
Muricopsinae - 8
Pagodulinae - 6
Rapaninae - 4
Trophoninae - 3
Ocenebrinae - 2
Ergalataxinae - 2
Typhinae (incl. Tripterotyphinae) - 1
Haustrinae - 0
'Misc. undecided' - 0

But for the subfamilies with the greatest number of nearly monotypic groups (five or fewer species) the breakdown is:
Rapaninae - 24
Ocenebrinae -18
Muricinae - 17
Ergalataxinae - 16
Typhinae (incl. Tripterotyphinae) - 9
Pagodulinae - 7
Muricopsinae - 7
Haustrinae - 3
Trophoninae - 2
'Misc. undecided' - 8

This gives us 135 near-monotypic groups, as compared to 35 groups with more than ten species. (This does not add up to the total of 176 genus-groups cited above as there are a few intermediate groups with 6 to 10 species.) To me this seems like a heavy tilt toward the small groups. In splitting up species into so many wee genera we are losing sight of the original point of taxonomy, which was to rank similar forms together so that we could recognize relationships. If every species is in a separate group, taxonomy is useless. What is worse, it makes communication almost impossible. Everyone knows what you mean when you call a shell a 'Murex,' but how many would recognize an *Ingensia* or a *Xastilla*?

And the real problem is that as more and more DNA work is done the situation will only get worse. We are going to discover that there are more and more differences between each species and more new genera and subfamilies, and eventually families, will be erected until truly each species is its own genus.

I am glad I am retired.

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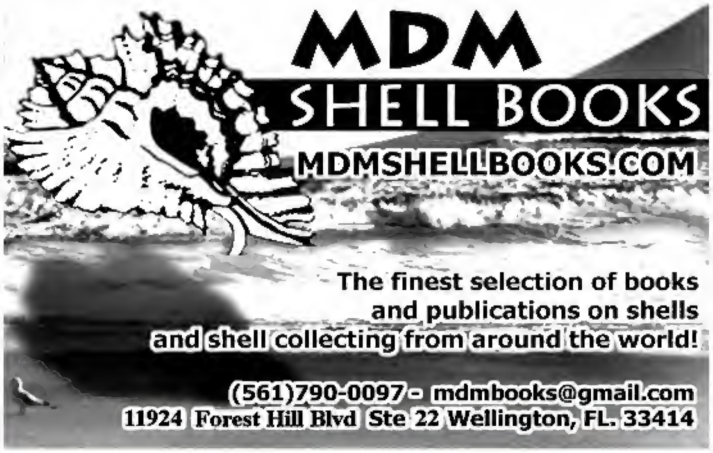

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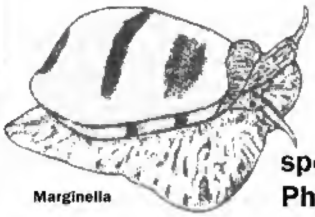

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Freshwater mussels in Brazil: past, present and future, at least, we hope they have one

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The unionids (order Unionoida Stoliczka, 1871) comprise a highly specialized and diverse group among the Bivalvia, containing six families: Unionidae, Margaritiferidae, Hyriidae, Mycetopodidae, Iridinidae and Etheriidae. Since the Permian/Triassic Period (± 250 million years) they have become adapted exclusively to the freshwater environment. Besides this aspect they are interesting for other characteristics, perhaps the most fascinating is the occurrence in the life cycle of a unique larval stage known as glochidium or lasidium that typically parasitizes aquatic vertebrates, usually fishes.

They also break the biogeographic 'law' that states that the greatest diversity of a given group is in the tropics. This rule may work well for birds and beetles, but not for Unionoida. The greatest diversity of this group is in the temperate United States, with around 300 species. Nevertheless, we also have a great number of species in the Neotropics, with approximately 172 species. Our area is great in number of species but they have been poorly studied in terms of morphology and taxonomy. Species of Hyriidae, Mycetopodidae, and Etheriidae are found in South America. Within Hyriidae is the genus *Diplodon* Spix in Wagner, 1827 (Fig. 1). This genus was created by Johann Baptiste von Spix, based on specimens collected by him in Brazil, to describe four species. These were not, however, the first species of Unionoida described from South America. The first species described was *Diplodon granosus* (Bruguière, 1792), formally described in the genus *Unio* Retzius, 1788, like most freshwater bivalve species described at that time. In those days, only European (or sometime later, American) researchers studied the fauna of South America. This situation took a long time to change and in the succeeding years great numbers of unionid specimens were sent to Europe and United States and identified based upon external similarities with European freshwater mussels. In 1880, Hermann von Ihering, a German, came to Brazil and did a marvelous job studying our mussels. His can be considered the first formal studies done in Brazil about Brazilian freshwater mussels. It was not until 1949 that a Brazilian researcher (Frederico Lange de Morretes) started working on the mollusks of Brazil. He presented a list of species of Mollusca found in our country, including freshwater mussels. In other words, the study of freshwater mussels done by native researches begins only in the middle of the Twentieth Century. Thereafter, studies done in Brazil by Brazilian researchers in Malacology were the rule. Nevertheless, few studies were conducted on the freshwater mussels of Brazil. A lot of gaps still remain in the understanding of these bivalves. To tell the truth, this is the situation for most of the continental molluscan species, except for those of known concern to medical and public health interests.

Our team is based in the state of Rio de Janeiro, so naturally a great percentage of our studies are conducted in this state. Besides, local studies are necessary to gather and collate information from earlier research on the freshwater mussels of Rio de Janeiro. Until 1960, Rio de Janeiro was the capital of Brazil, thus an obligatory stop for foreign researchers in colonial and imperial times. Examples of this are C.R. Darwin and J.B. Spix, who during their voyages through Brazil stayed for some time in Rio de Janeiro. As already stated, the collected specimens were almost all sent to foreign museums and, through the Twentieth Century, little attention was paid to freshwater mussels of Rio de Janeiro. Notes or records of distribution were pretty much the extent of 'research' into our freshwater mussels. From the beginning of the 1970s to the early 1990s, two researchers, Luiz Carlos Alvarenga and Célia Neli Ricci at Museu Nacional do Rio de Janeiro, studied populations of *Diplodon* and put together an excellent collection of specimens, especially, from Rio de Janeiro state. Unfortunately, these studies became discontinuous after their retirement. In recent years there has been no formally established freshwater mussel senior researcher in state of Rio de Janeiro.

The second half of the Twentieth Century was also a time of quick economic development in Brazil, when our country, which was mostly rural, started to change and become more urban and industrialized. The population grew rapidly, roads and plants were built, and the cities expanded. Why am I talking about this? Aside from modern facilities and new technology, this development also led to some negative side-effects, as rivers and other bodies of water were strongly impacted. Certainly several populations of freshwater mussels vanished without any notice. This is important to understanding what we saw in recent freshwater mussel investigations in our area. Recently, we also became more aware of another problem that threatens our freshwater mussels as well as many other native aquatic animals, the invasion of exotic species. Four species of Asian bivalves have been introduced into Brazil, namely: *Corbicula fluminea* (Müller, 1774), *C. largillierti*

(Philippi, 1844), *C. fluminalis* (Müller, 1774), and *Limnoperna fortunei* (Dunker, 1857). These environmental impacts (especially when combined) are certainly major factors that explain a sad fact; most of the mollusks included in the *Brazilian Red Book of Threatened Species* are freshwater bivalves. This also reinforces the urgency to study these incredible animals. So today we are once more trying to study the mussels from the state of Rio de Janeiro.

The main goal of this work is a revision of the genus *Diplodon* (Fig. 1). To achieve this objective, studies on taxonomy, morphology, and distribution of the species in this genus are being conducted. Some of these studies are possible only if we have animals with soft parts, a major complication because most museum samples are composed of only shells, without soft parts. The former researchers of our fauna paid little attention to the soft parts. This is clearly seen when recovering old descriptions of species based exclusively on shell morphology. Thus, obtaining fresh specimens through field trips is a basic requirement.

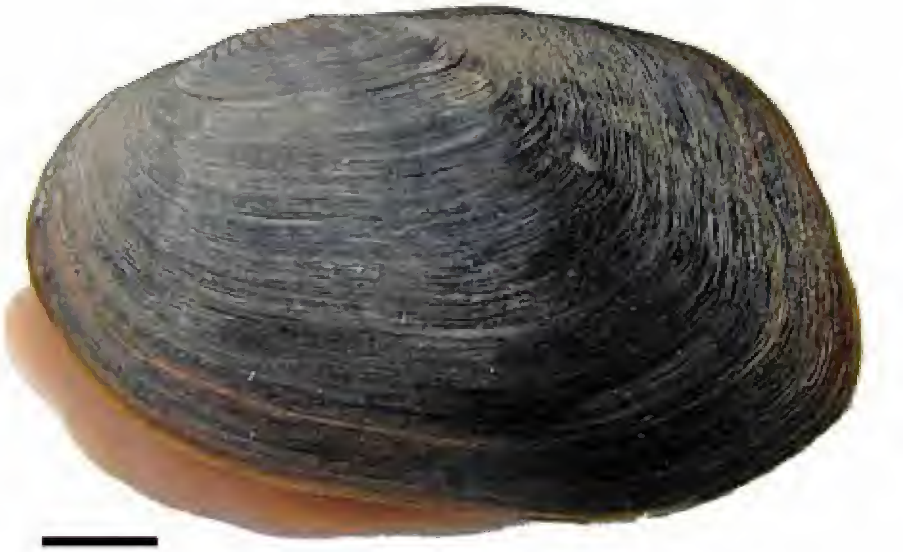


Fig. 1. *Diplodon* sp. from municipality of Itaguaí, Rio de Janeiro, Brazil. Scale bar = 1 cm.

So, how did we conduct these field trips? First, we had to select the areas to explore. At this early stage, we concentrated our investigations on the type localities. Unfortunately, former researchers in Rio de Janeiro often paid little or no attention to specific type localities. The destruction of freshwater habitats has also affected the type localities of freshwater mussels. In many cases only a part of the river is preserved, usually the headwaters. Freshwater mussels are sensitive to high water-flow impact and generally prefer downstream stretches due to the higher amount of nutrients and the lower stream flow. This situation makes our job more difficult because mussels and human beings prefer the same part of the river. Downstream stretches of the rivers are usually in the plains, where humans prefer to build their houses. So we decided to investigate not only the type localities, but also the nearby rivers, to improve our chances to find mussels.

When we find a suitable place to collect, two direct search methods are used. First, we seek mussels directly on the substrate using hands and feet (Fig. 2). In the second method we use a handled metallic scoop to search the substrate. Using these two methodologies we were able to recover adult and juvenile specimens. The specimens found were transported to the laboratory for further study.

The municipality of Nova Friburgo in the state of Rio de Janeiro is the home of two nominal species of *Diplodon*: *D. expansus* (Küster, 1856) and *D. rhuaconicus* (Küster, 1856). In the original description of *D. expansus*, Küster listed precisely where the type material was collected, namely: Cônego River, near Nova Friburgo. For *D. rhuaconicus* this information is not

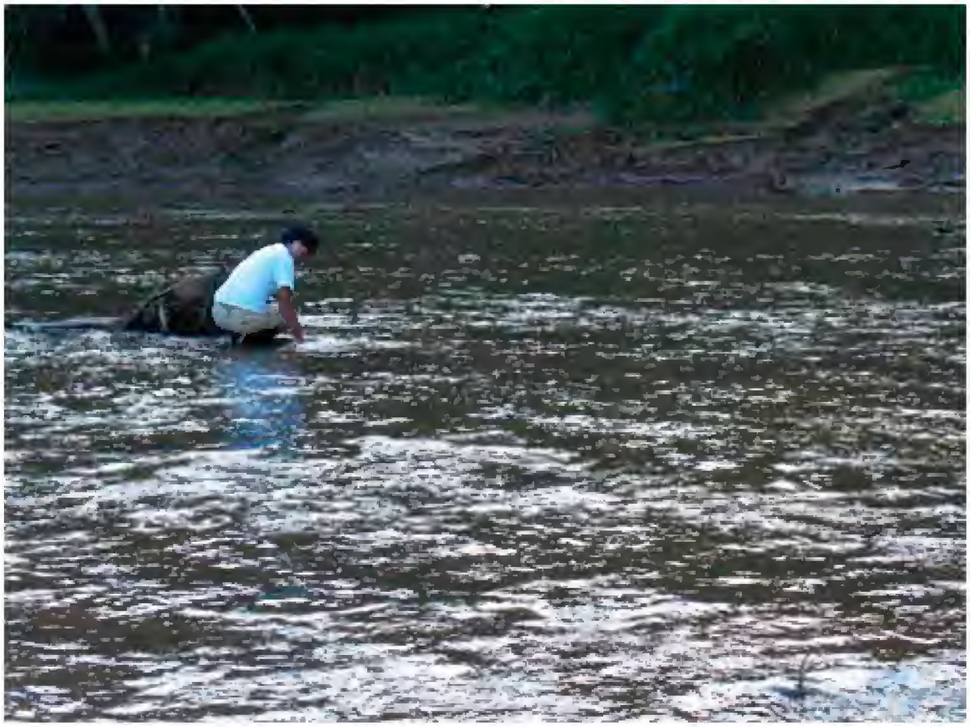


Fig. 2. Searching for mussels at the middle of Grande River (Rio de Janeiro, Brazil) using bare hands. Credit: L.E.M. de Lacerda.

given. The Cônego River was near Nova Friburgo at that time; now this river is inside the city and the riparian environment is completely changed. Cônego is the name of the river as well as the name of a populous neighborhood of Nova Friburgo. The river receives part of the sewage from the city. Freshwater mussels are no longer found in this river. Cônego River is part of the Dois Rios catchment, and this occupies an extensive area (3200 km^2) in the state of Rio de Janeiro. So it was possible to search for mussels in others parts of the drainage. In a different river near the same municipality and catchment, we found specimens of *Diplodon*. This material will certainly help elucidate the identity of these two nominal species.

The problem becomes even more challenging after collection. We have the specimens, but Unionoida is a plastic group of bivalves and can be morphologically influenced by the environment. The same species at headwaters and downstream, and under influence of different environmental conditions, can show morphological differences. This problem has haunted freshwater bivalve research. The identity of some species is not well resolved even today. Putting all this information together, a question can be raised: were environmental conditions at the time these species were collected and described different from present day conditions? Of course there are environmental modifications, but to know exactly what changed is impossible. Nonetheless we may have a good guess by examining old paintings. Johann Moritz Rugendas, in the beginning of the Nineteenth century, traveled around Brazil recording landscapes and fortunately he painted some natural landscapes in the state of Rio de Janeiro (Fig. 3A). Comparing these old paintings with recent photographs (Fig. 3B-D), we see how much the environment has changed. This kind of information is important when evaluating the data obtained about the freshwater mussels. If the environment changed, it is quite possible that the mussels also changed, at least in some general aspect. To deal with this we are conducting morphological studies to supplement the original descriptions. Other kinds of studies are also being conducted. All information is important in solving this puzzle.

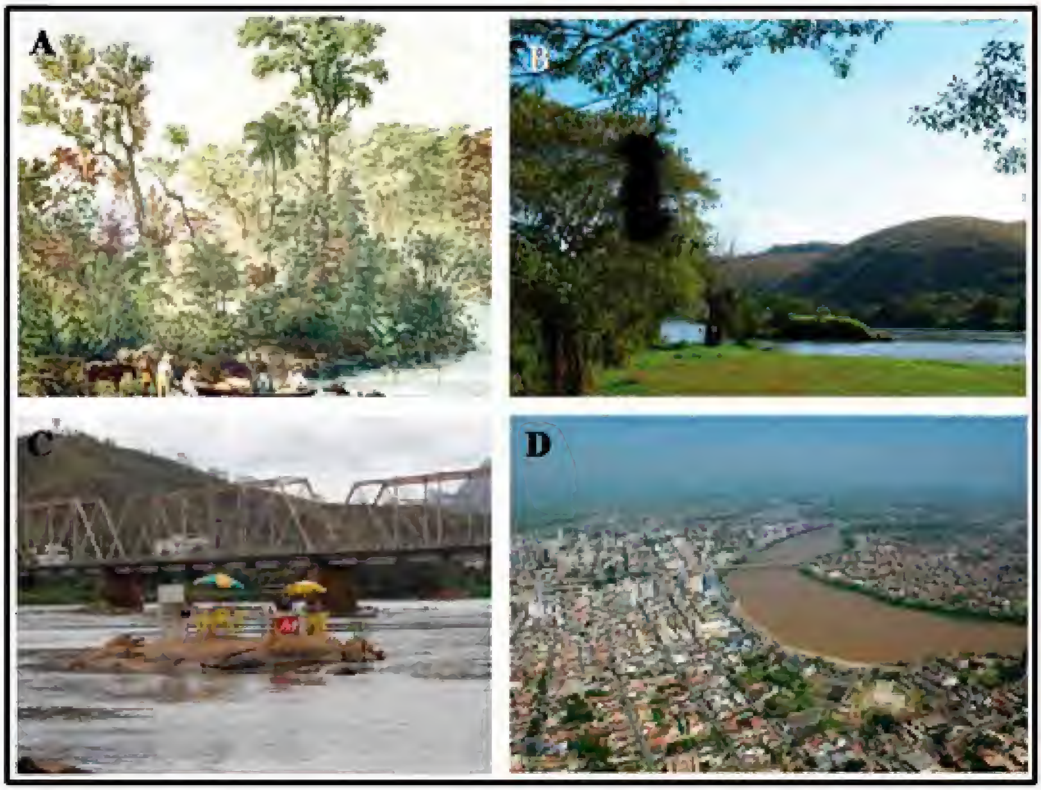


Fig. 3. Some views of Paraíba do Sul River. (A) Painted around 1835 by Rugendas. It is possible to see a luxurious forest around the river. (B) São Sebastião do Paraíba, municipality of Cantagalo, a place with minimum environmental impacts, yet it is possible to see deforestation of the margins and hills. (C) Stretch of Paraíba do Sul River inside the municipality of São Fidélis. In view are: a bridge, some houses, and a curious use of an island in the river as a bar. Once again, deforestation of the hills and margins of the river is visible. (D) Municipality of Campos dos Goytacazes. A big city with 463,731 inhabitants. It is not necessary to enumerate the damage caused by this huge population at the margins of the river. Credits: A – J.M. Rugendas, from http://pt.wikipedia.org/wiki/Ficheiro:Rugendas_-_Rio_Panahyba.jpg. B – L.E.M. de Lacerda. C – I.C. Miyahira. D – from http://www.sea.proderj.rj.gov.br/download_zee/fotos_voo_zee/Fotos_Voo_ZEE.htm.

We hope to have new (good) results very soon. *Diplodon* is an important group of threatened freshwater mussels and the development of knowledge concerning taxonomy of the genus will influence not only the systematics, but could also improve conservation strategies. It is extremely difficult to attempt conservation of a species when you are uncertain of its identity. The grant received from Conchologists of America was of great importance in developing this ongoing work by providing essential financial support for field trips to some type localities and respective surroundings in state of Rio de Janeiro, southeast Brazil.

Acknowledgements

The authors wish to thank the Malacology Team of Universidade do Estado do Rio de Janeiro for the help given in the field trips. This research was partially supported by CNPq/PROTAX (562291/2010-5), including scholarships to ICM and JBC. MCDM receive a scholarship from Fundação Luiz Englert - UFRGS (FURNAS/ANEEL).

COA Convention 2012

Tom Eichhorst

The 2012 annual COA convention (19-24 June), held in conjunction (three day overlap) with the annual AMS convention (16-21 June), was by any measure, a rousing success. Every aspect, whether it was the welcome party, the banquet, the field trips, the presentations, the auctions, or the bourse, seemed well-orchestrated and expertly accomplished. This obviously speaks volumes for the dedication and hard work of the many folks from the Philadelphia Shell Club and other volunteers who made it all happen. Last minute problems with bus schedules, traffic, room changes, etc. were all handled swiftly and were mostly transparent to attendees. Everyone involved should be justifiably proud of their efforts. It was certainly a success.

If you didn't attend this year's convention, then you really missed a good one. If you have never attended a COA convention, then you might rethink things a bit. Yes, I realize that a week's worth of hotel room and meals, not to mention ever increasing airfare rates, buys a lot of shells - or a family vacation. On the other hand, nowhere else will you have such an opportunity to meet people with an interest in conchology similar to yours in a setting dedicated solely to this interest. There is also the very real possibility of expanding your interest in shells or your knowledge of conchology by interacting with folks with a different conchological interest or area of expertise. From amateur to scientist, dedicated collector to craft person, all are welcome and pretty much guaranteed of finding someone at the convention who shares their interests. This year's convention had attendees from Argentina, Taiwan, Great Britain, Philippines, Brazil, Japan, Germany, Indonesia, Greece, South Africa, Australia, and from around the USA. **Next year's convention will be at the Hyatt in Sarasota, Florida (16-21 July 2013, with field trips July 14, 15, 16, 19, & 21)**. All of the details will be in a future issue, but now is really the time to start thinking of maybe giving yourself a shellers week in Florida. See you there.

Here are some images from the COA-AMS Philadelphia convention with images provided by: Anne Joffe (AJ), Carole Marshall (CM), and Ellen Bulger (EB).

(above): Kyo Daiko performers shook the halls of the Academy of Natural Sciences of Drexel University Philadelphia (AJ).

(above): *Tyrannosaurus rex* loomed over guests at the welcome party (AJ).

(below): The cake celebrating the 1812 founding of the oldest natural history museum in the world (AJ).

(below): David Woodman from Hawaii and a free-flying butterfly in the academy (CM).

(above): New COA President, José H. Leal, director of the Bailey-Matthews Shell Museum, Sanibel, Florida, and Past President of the AMS (AJ).

(above): 2012 COA Board of Directors, left to right: Tom Eichhorst (Editor), Steven Coker (Treasurer), Phyllis Gray (Secretary), Anne Joffe (Convention Coordinator), Harry Lee (2012 Member at Large, 2013 Vice-President), José Leal (2012 Vice President, 2013 President), Doris Underwood (Membership), Fabio Moretzsohn (Trustee), Henry Chaney (Past President), Alice Monroe (2012 President), not shown is Jim Brunner (2013 Member at Large). Photo by Matt Blaine.

Fish mobile at the entrance to the Philadelphia Aquarium, a field trip enjoyed by many COA members (EB).

(above): "Texans in peril!" Patty Humbird and Wanda Coker in the jaws of a Cenozoic Era *Megalodon* (AJ).

(above): The ever-popular Silent Auction. A chance to find that specimen everyone has overlooked (right!) or that book or paper that was lent out and never returned (AJ).

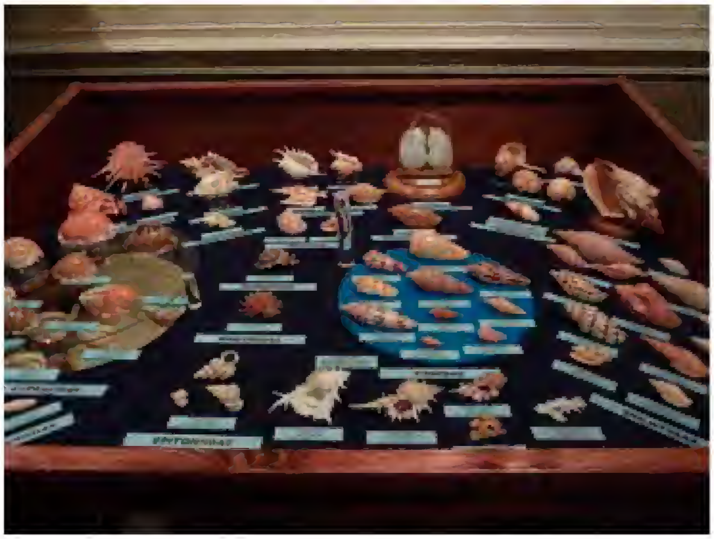
(above): Hank Chaney, Director of Collections & Research, Santa Barbara Museum of Natural History, California, and COA auctioneer, readies the crowd to dig deep and bid top dollar. The annual auction (with donations from dealers and members) helps support the COA annual grant program (AJ).

(above): Paul Callomon, Collections Manager, Department of Malacology, Academy of Natural Sciences of Drexel University, Philadelphia, Pennsylvania, and COA auctioneer, dons his Samurai garb in preparation for the auction battle (AJ).

(above): Ed Torre with his collection of Peter Dance's 50 rare shells. Although many of Dance's shells are now fairly easy to obtain, some remain quite elusive and this feat has been accomplished by very few collectors (AJ).

(above): The Crown Plaza 'River Side' tent where the combined COA-AMS banquet was held. It was an impressive venue - quite untent-like (EB).

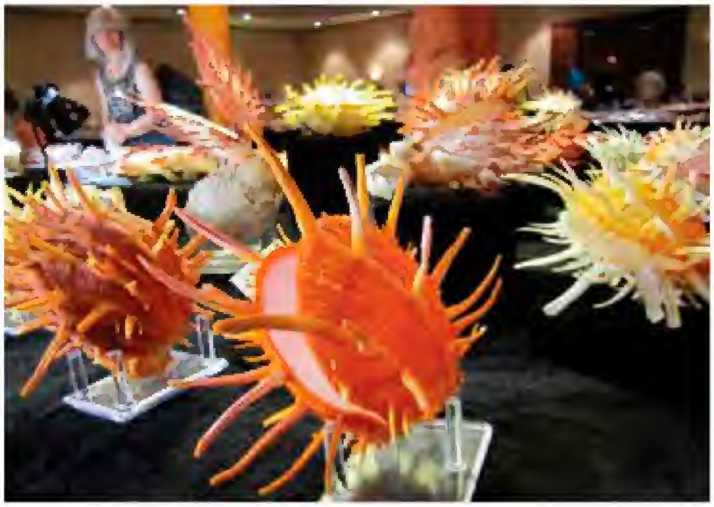
(above): Peter Dance "attended" the convention via Skype. The Internet hookup allowed him to comment on the presentation of the 50 rare shells of his book, *Rare Shells* (1969) (AJ).



(above): A better view of Ed Torre's collection. The white bivalve at the back of the case (the thin and fragile deepwater Caribbean *Pholadomya candida G.B.* Sowerby I, 1823) is perhaps the most difficult to obtain (AJ).

Don Pisor unloads his shells in preparation for the bourse. Yes, the California plates (long way to come) read, "CSHL VAN." While I get that, I am not sure why the SR-71 is in the read window. Whatever the reason, it was a great aircraft (EB).

(above): The convention ballroom transforms into the COA Bourse with 10,000 square feet of shells (EB).



(above): A table of colorful and intricately sculptured *Spondylus*. These shells have been collected and traded since prehistoric times and their popularity is as great as ever (EB).

(below): Scallops anyone (EB)?

(above & below): Displays like these are what make the bourse so much fun, with some 40 dealers laying out their best shells from around the world (EB).

Winners of the 2012 *Neptunea* Award, Martin Synder (left) and Gary Rosenberg (right), both of the Department of Malacology, Academy of Natural Sciences of Drexel University. Dr. Martin wrote the article on page 4 of this issue and Dr. Rosenberg was our host at the 2012 convention (AJ).

Jacksonville Shell Club 2012 Shell Show

JACKSONVILLE SHELL CLUB
Jacksonville, Florida

The 2012 Jacksonville Shell Club Shell Show (20-22 July 2012) had a total attendance of over 1,172 at the Morocco Shrine Auditorium. This was the 46th show hosted by the club since it was founded in 1959. The Jacksonville Shell Club has a bi-monthly newsletter, the "Shell-O-Gram," and monthly meetings. More information about the club and club activities can be found at: www.jaxshells.org

This year's show was a large event with over 380 feet of exhibits in the scientific category alone. Harry Berryman won the DuPont Trophy for his display, "A Sampling of Philippine Cones." Thus demonstrating, to those who know him, an interest beyond Strombidae for which he is so well known. Charlotte Thorpe won the R. Tucker Abbott Award for "Worldwide Self-Collected" for her superb specimen of *Astraea phoebia* Röding, 1798. This shell was also "Shell of Show - Self-Collected." Charlotte also won the overall "Shell of Show" with a large gem *Fasciolaria tulipa* (Linnaeus, 1758). Judges were Bill Lyons and Anne Joffe. The show chairman was Brian Marshall.

The COA Award at the Jacksonville show was won by Gene Everson. The title of his exhibit was simply "Veneridae," but it was certainly no simple exhibit. Gene's exhibit included 727 specimens of 350 venerid species displayed in 16 cases spanning a total of 36 feet! While Gene has won numerous awards over the years, this has to be one of his difficult endeavors. Just getting the scientific names on the labels correct would have been quite a feat. Congratulations.

(above): Gene Everson with his COA Award for "Veneridae."

The succinct central display card for Gene's "Veneridae."

Sixteen cases and 350 species of Venus clams.

Gulf Coast Shell Club 2012 Shell Show

The 2012 Gulf Coast Shell Club Shell Show, “Shell Show Celebration 2012,” was held at the Panama City Beach Senior Center, 13-15 July 2012. There were over 550 attendees who were thrilled with 365 feet of scientific display cases of shells. The Gulf Coast Shell Club meets the second Tuesday of each month (except June and December) at the Lake Huntington Club House in Panama City, Florida. Annual dues are $8.00, $10.00 for family membership. More information can be found at: www.gulfcoastshellclub.weebly.com

This year’s competition found the DuPont Trophy taken home by Charlotte Thorpe for her *Panopea bitruncata* (Conrad, 1872) “Self-Collected Worldwide.” This species, common name the Atlantic geoduck (pronounced “gooey duck” for those unfamiliar with this bizarre bivalve), is certainly no beauty. So Charlotte’s specimen must have been quite spectacular. The other “Shell of Show” was a *Distorsionella lewisi* (Beu, 1978) displayed by Vicky Wall. Another shell that did not make it on color and pattern. Shell show judges were Harry Lee and Robert Janowsky.

(above): Jim and Linda Brunner take the COA Award for “They Once Were Rare.”
(below): Takes a tough man to travel with a red and orange snail on his truck.

The COA Award was presented to Jim & Linda Brunner, of Panama City, for their display, “They Once Were Rare.” Jim and Linda’s exhibit examined the 50 rare shells of Peter Dance’s *Rare Shells* (1969) to determine the present status of these shells. They had a total of seven display cases that spanned 19 feet. Despite the fact that many of Dance’s 50 rare shells are now more accessible, it is still quite a feat to collect all 50 species. In fact, only a handful of collectors have accomplished this goal.

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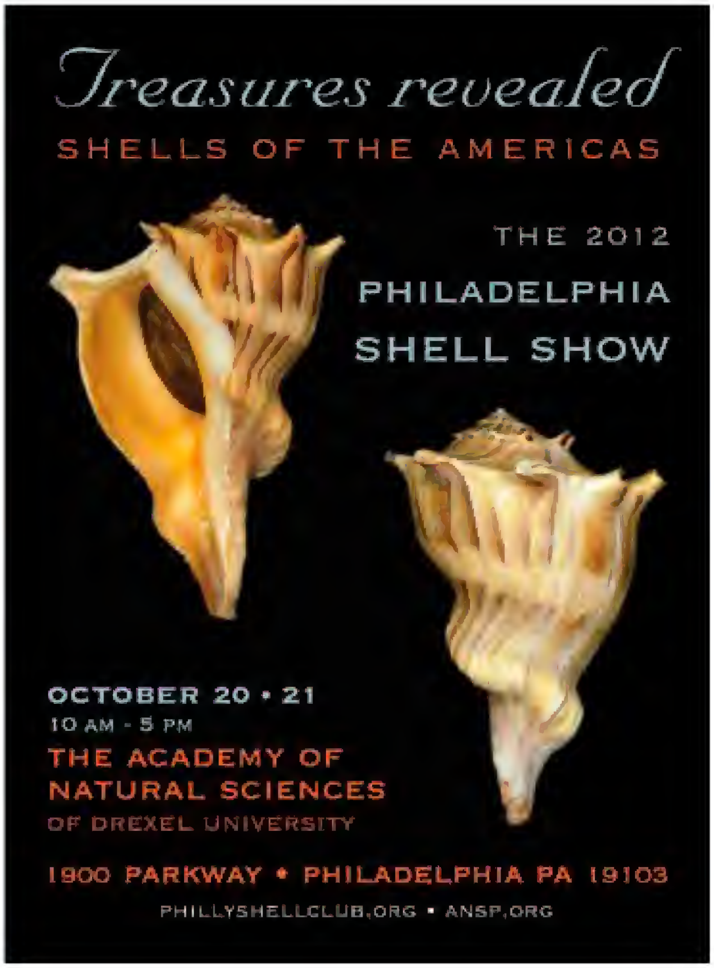
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The 2012 Philadelphia Shell Show

Paul Callomon

The Philly Show is a little later than usual this year, on October 20 and 21. As many already know, 2012 marks the bicentennial of the founding of the Academy of Natural Sciences in Philadelphia. The formal study of mollusks in the USA started there with the work of Thomas Say, one of the institution's founders, and the Academy has since been home to many famous names – George W. Tryon, Henry A. Pilsbry, and R. Tucker Abbott, among them. In honor of this great heritage, this year's theme is "Treasures Revealed: Shells of the Americas." A special award will be given for the exhibit that the judges feel best reflects the diversity and aesthetic appeal of "American" shells – from Cape Horn to Alaska!

Of course, exhibits on other topics and on any other part of the world are also most welcome and there will be the usual array of major national trophies to compete for, including the Master's, DuPont, and COA awards. Unique to the Philly Show are the Pilsbry, R. Tucker Abbott, John Dyas Parker, Robert B. Fish, and Leonard Hill Awards. For the science catagory, our judges will be **Harry Lee** and **Rich Goldberg;** and for the artistic division the judges will be **Anne Joffe** and **Hannah Milman**.

The famous bourse will be open both days and show-goers will also get to see the impressive bicentennial exhibit, "The Academy at 200: The Nature of Discovery," as well as shell-themed programs and activities. There will be behind-the-scenes tours of the third largest shell collection in the world, squid dissections, Sailor's Valentine workshops, and microshell sorting demonstrations. Philadelphia Shell Club staff will be on hand to identify visitors' beach finds.

On Saturday evening we are planning our traditional Supper and Awards Ceremony in the Academy's Dinosaur Hall. Tickets for this popular event will go on sale soon via the Philadelphia Shell Club web site www.phillyshellclub.org and this will be announced on Conch-L.

All the details, the entry forms, and the guide to judging are available at www.phillyshellclub.org/show.html

The club has reserved its usual block of rooms at the Windsor Suites, just two blocks from the Academy (www.windsorhotel.com). Contact the hotel directly at 1-877-784-8379 and ask for the Philadelphia Shell Show rate. The price is unfortunately somewhat higher this year, as there is a large convention in town that weekend and this has affected all hotel room rates. It's nevertheless about half the walk-in rate. We advise everyone to book their accommodation in good time!

2012 SHELL SHOWS & RELATED EVENTS (August – December)

Information is subject to change. Please verify with individual organization.

Aug. 17-19 2012
JERSEY CAPE SHELL SHOW, Stone Harbor, New Jersey
The Wetlands Institute, Stone Harbor
Karen Lelli, e-mail: kjlelli@comcast.net
(856) 691-5831

Sept. 2012
INTERNATIONAL SHELLS & FOSSIL BOURSE, Ottmarsheim, France
Show for this year has been cancelled due to building structural repair

Sept. 22-23 2012
ANNUAL GERMAN SHELL FAIR, Oehringen, Germany
KULTURA Hall, Herrenwiesenstr. 12
Kurt Kreipl, Hoehenweg
D-74613 Oehringen-Cappel, Germany
61 (7941) 62-826
e-mail: meeresmuseum@t-online.de

Sept. 22-23 2012
NORTH CAROLINA SHELL SHOW, Wilmington, NC
Cape Fear Museum of History & Science
814 Market Street, Wilmington, NC 28401
John Timmerman, Show Chairman
(910) 798-4368
e-mail: jtimmerman@nhcgov.com

Sept. 28-30 2012
2nd INTERNATIONAL CONE MEETING, La Rochelle, France
Natural History Museum, 28 rue Albert 1er
17000 La Rochelle
Michael Rabiller:
michael.rabiller@ville-larochelle.fr
33-5-4641-1825
Antonio Monteiro: a.j.a.monteiro@netcarbo.pt

Oct. 20-21 2012
PHILADELPHIA SHELL SHOW, Philadelphia, PA
Academy of Natural Sciences, Parkway & 19th St.
Paul Callomon, Academy of Natural Sciences
Parkway & 19th St., Philadelphia, PA 19103
(215) 299-1159
e-mail: callomon@ansp.org

Oct. 26-27 2012
SEA SHELL SEARCHERS SHELL SHOW, Lake Jackson, TX
The Center for the Arts & Sciences
400 College Blvd., Clute, Texas 77531
Patty Humbird -- (979) 265-1320
Wanda Coker -- (979) 297-0852
e-mail: shellclub@earthlink.net

Oct. 27 2012
SYDNEY SHELL SHOW, Sydney, Australia
Steve Dean, 166 Narabeen Pk Pde
Mona Vale, NSW 2103 -- 61 (2) 9979-5736
e-mail: steve@easy.com.au -- cell: 61 (4) 1175 1185

Oct. 27 2012
BRITISH SHELL COLLECTOR'S CLUB CONVENTION, Essex, England
Theydon Boys Community Centre, Theydon Boys, Epping, Essex
Tom Walker, 38 Redlands Road
Reading, Berkshire RG1 5HD, England -- 44 (118) 987-4294
e-mail: tom@tmwalker.co.uk

Oct. 27-28 2012
XVII PRAGUE INTERNATIONAL SHELL SHOW, Prague, Czech Rep.
KULTURNIDUM LADVI Buresova 1661, Prague 8
Jaroslav Derka, Holeckova 51/370
15000 Praha 5, Czech Republic -- 42 (2) 5731 6246
email: jderka@volny.cz
web sites: http://cksl.webpark.cz http://shells.webz.cz

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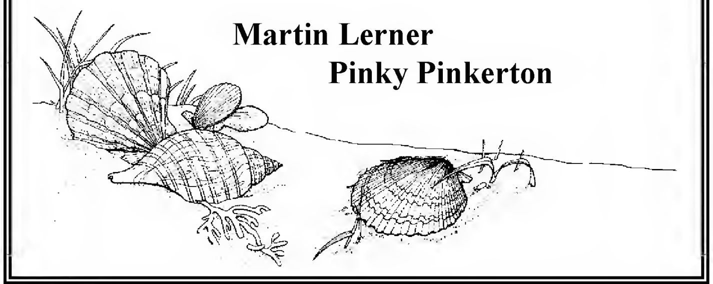
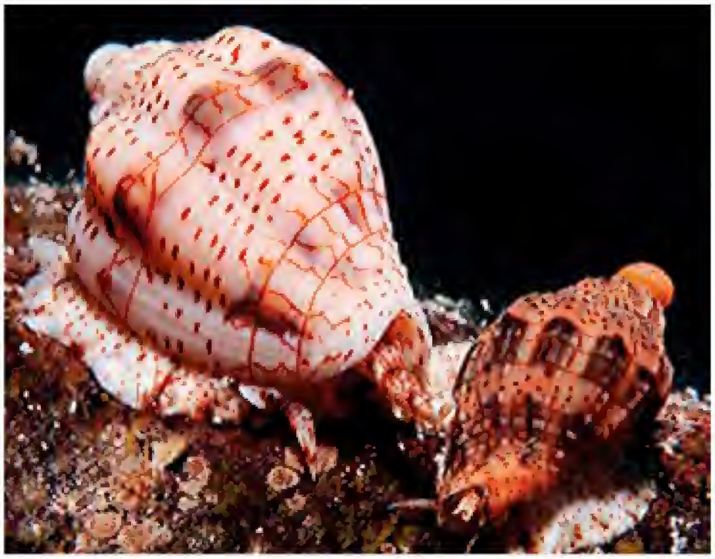
In Memoriam:

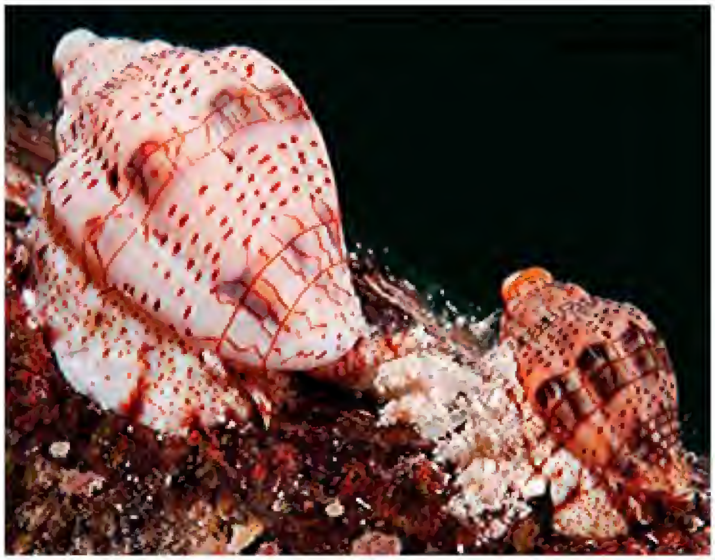


Martin Lerner
Pinky Pinkerton

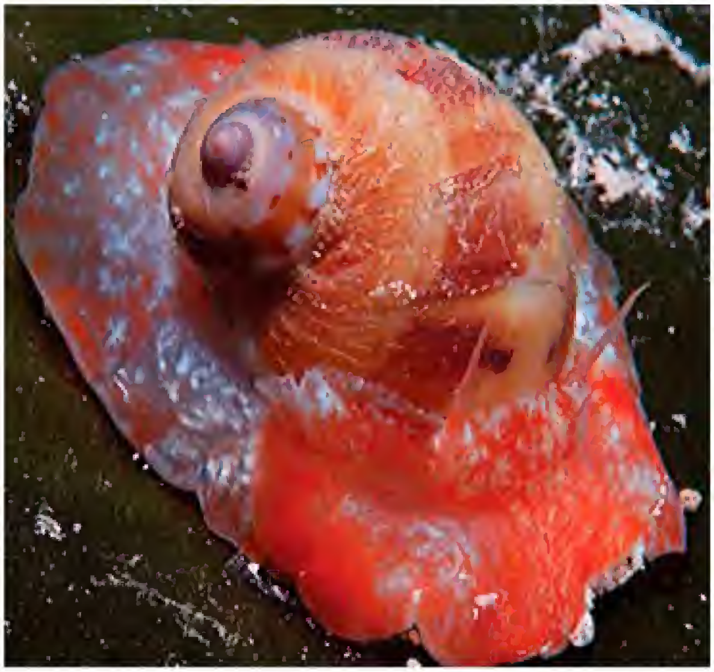
Shells from Honduras - photographed *in situ* by Charles Rawlings

As the great images on the front and rear covers of this issue make obvious, Charles Rawlings, doctor, lawyer, and nature photographer, has once again sent in some of his images of mollusks *in situ*. Earlier this year he spent some time diving off of Honduras, and here are some of the images he captured. Many of these species have never before been photographed live and in color, and some of our readers may be particularly interested in the photo of *Falsilyria polypleura hennequini* (Petuch, 1998) and *Falsilyria polypleura sunderlandi* Petuch, 1987. Both of these recently named species are variously considered to be valid species, valid subspecies, or just forms of *Voluta polypleura* Crosse, 1876. The World Register of Marine Shells (WoRMS, http://www.marinespecies.org) lists both as forms (junior synonyms) of *Voluta polypleura*. If geographic separation is considered as a required facet of subspecies rank, then these are obviously not subspecies as they seem separated by only a couple of millimeters. So it appears the issue is between forms and species. As the images show, the two shells differ in color and pattern, while the visible soft parts of the animals seem quite similar. The protoconchs are certainly different. So Charles leaves us with some fantastic photography and an unsolved mystery.

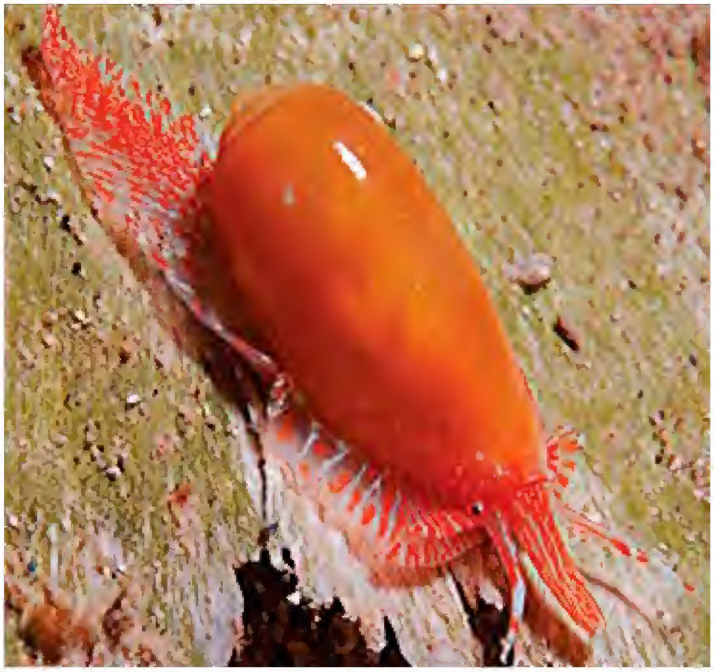




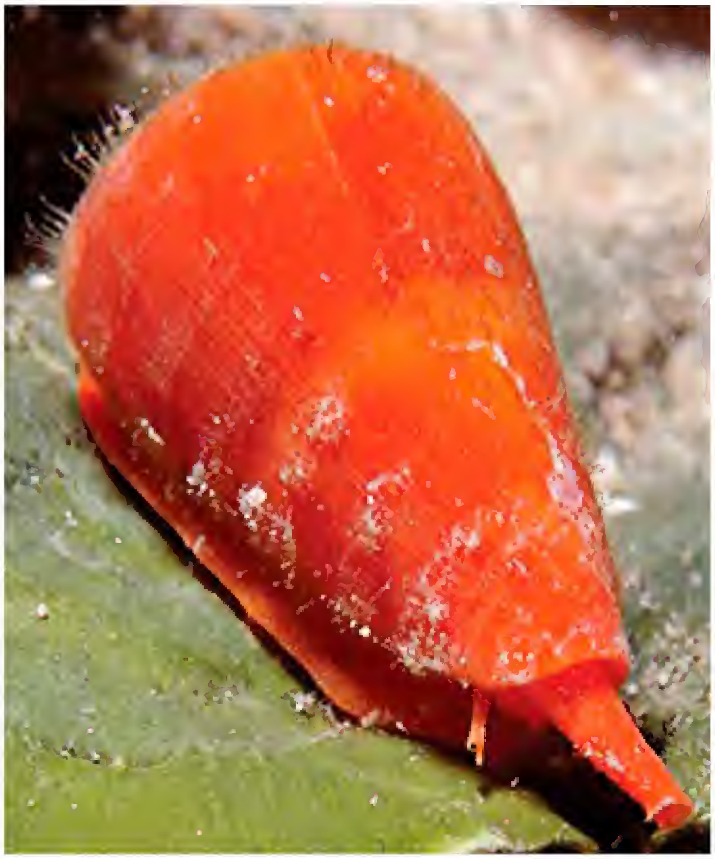
(above & right): ***Falsilyria polypleura sunderlandi*** **(left) and** ***Falsilyria polypleura hennequini*** **(right), both considered variously species, subspecies, or forms of** ***Voluta polypleura.*** **Whether valid species or just color forms, there is no denying the beauty of this Caribbean volute.**



(above): ***Natica tedbayeri*** **Rehder, 1986.**

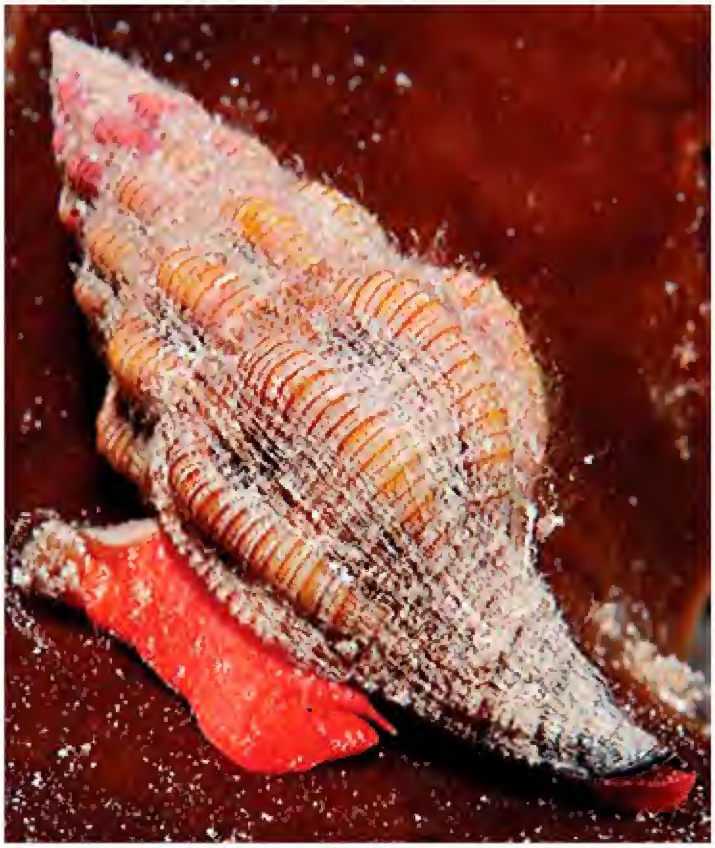


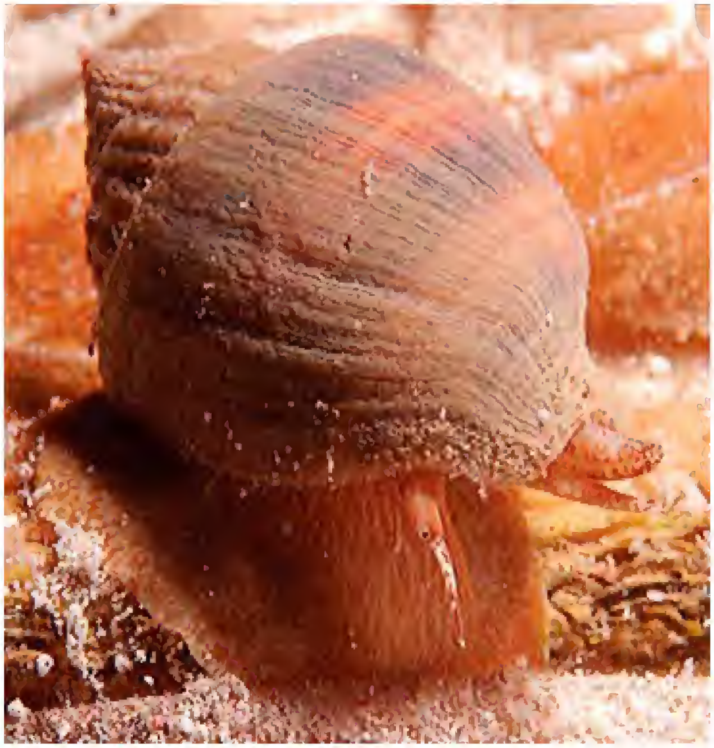
Prunum amabile **(Redfield, 1852).**



(above): A beautifully colored *Conus daucus* Hwass, 1792, in the Utila Cays, Honduras.

(below): *Latirus abbotti* Snyder, 2003, with the colors and patterns of the shell hidden by periostracum and incrustations.





(above): *Cancellaria reticulata* (Linnaeus, 1767), in the Utila Cays, Honduras.

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SEP02

COA: Then and Now

Tom Eichhorst

Conchologists of America began in October of 1972 with eight enthusiastic shell collectors gathered at the Newport Inn, Rhode Island, at the behest and invitation of John Paduano. This small group felt that the American Malacological Union (AMU, now American Malacological Society, AMS) had become too 'scientific' and seemed to no longer really include amateur collectors. The original eight were:

Kirk Anders -- Florida (photo second from left)
Mrs. Robert Armstrong -- Massachusetts
Carl Erickson -- Massachusetts
Dorothy (photo far left) and Robert Janowsky (photo middle) -- New York
Mrs. Bette Rachlin (photo second from right) -- Massachusetts
Miss Mavis Walkup -- New Mexico
John Paduano (photo far right) -- Rhode Island

Because this first 'convention' was in October, there has been some confusion over dates for the age of COA (calendar year versus dating from the first meeting). For our purposes, the COA began in 1972, the date of the first convention. They even had a banquet.

The folks gathered at this first convention set dues at $2, elected Bette Rachlin as first COA President, and opted for an image of *Strombus gigas* (the queen conch) as the COA logo. Because the queen conch was also used by other clubs, it was quickly dropped and an image of a *Neptunea*, drawn by Richard Sedlack of Florida, was adopted as the new logo. This new shell logo was purposely drawn to be generic and not represent any exact species of *Neptunea*.

By year two, 1973, COA membership totaled 141, and 26 members attended the convention in Freeport, Bahamas. The convention had been scheduled to leave Fort Lauderdale, Florida, on a cruise ship - but the ship blew up just before the convention, so plans had to be changed. The treasury stood at a total of $162.61. The members also decided to publish a quarterly *Conchologists of America Bulletin*, edited by Frank Nelson of New York City. Bulletin number one was published in early 1974.

In year five, 1976, there were 213 members and Tom Rice took over as editor of the COA Bulletin. At the convention held in Portland, Oregon, the members voted to begin building funds that could be used for scholarships. This year was the first use of the COA logo in the bulletin and bulletin number seven was the first to have a photograph.

By year seven, 1978, Tom Rice was replaced by Richard Goldberg as editor and members adopted a "COA Trophy" to be awarded at shell shows. The COA Award originally came with a gift certificate for shells, books, or magazine subscriptions, but this feature was later dropped. Attending shell dealers had been selling shells from their rooms, but this year a few set up in the hotel lobby. This proved quite popular and Marty Lerner proposed setting up a separate room for shell sales - the COA Bourse was born. A new logo designed by Richard's brother, Marc Goldberg, was instituted as well as lots of photos for the bulletin.

(above): Five of the original eight COA members (left to right): Dorothy Janowsky, Kirk Anders, Robert Janowsky, Bette Rachlin (first COA President), and John Paduano.

(below): Some of the changes from *Conchologists of America Bulletin* to *American Conchologist*, left to right: no. 5, 1975; no. 20, 1980; and vol. 11, no. 3, 1983. The illustrated shell on the 1983 cover is a pen & ink drawing of *Favartia bojadorensis* (Locard, 1897) by Anthony D'Attilio in the Foster & Glass collection.

By year ten, 1982, dues were $7.50 for an individual and $10 for a family or overseas member. The convention that year was held at Sanibel, Florida, and had over 200 attendees. Also in 1982, the organization handed out 21 COA Awards and voted to establish a $500 scholarship fund. The editor of the *COA Bulletin* was Gary Rosenberg, replaced that year by Charles Glass and Robert Foster. They established procedures to accept the first advertisements in the *COA Bulletin*.

In 1985 the convention was held in Philadelphia, Pennsylvania, and the membership approved the first financial grants for molluscan-related research (dependent upon available funds). Donald Dan volunteered to organize a list of shell shows for the *COA Bulletin* and to order, distribute, and track the COA Awards - daunting tasks he continues to perform today (thanks Donald!). This year also saw the first use of color for the *COA Bulletin*.

By year 16, 1987, membership was at almost 1,000 and the annual convention was held in St. Louis, Missouri, with 165 attendees. This year Lynn Scheu became editor and, after a bit of heated discussion, changed the name of the *COA Bulletin* to *American Conchologist*.

In year 20, 1992, there were over 1,200 members of COA (the 1,000 member mark had been hit in 1989) and the convention was held at Long Island, New York. This year the convention auction ran well past midnight and brought in close to $5,000, a new record. Grant monies for 1992 totaled $5,010 for eight applicants.

In year 30, 2002, the convention was in Sarasota, Florida. There were approximately 1,000 members and the grant monies were now approaching $15,000 per year. COA was now into the digital world thanks to the *Lambis Group* (Linda Brunner, John Caldera, Amy Edwards, Richard Goldberg, Gary Rosenberg, Lynn Scheu, and Debbie Wills). These folks cranked up Conch-L and the COA web site in 1997. This was accomplished despite some strong and stubborn opposition. By the 2002 convention, both of these “computer nonsense” programs were established and growing aspects of COA. Also this year Lynn Scheu resigned as editor. Tom Eichhorst of New Mexico (a well-known shelling state) became the new editor.

And so we arrive at 2012, year 40 (or the 39th anniversary of COA). We have some 800 members, we have given research grants of $15,000 each year for the past decade, Conch-L and the COA web site are established and mature aspects of COA, and we face some real challenges for the future. The annual conventions of AMS and COA served a number of functions through the years, but maybe the most important was social networking. Our modern digital information age has made such networking possible from the palm of your hand and sitting at my cluttered desk in my shell room I have virtually real-time access around the globe. As I was writing this I was interrupted and after a couple of clicks on the computer, spoke live via Skype to my daughter in Germany. Earlier I ‘spoke’ (via email) with a friend in Indonesia and one in Oregon. Then not 30 minutes ago I ‘spoke’ (again via email) with a friend in France. This later case is perhaps most amazing as neither of us speaks the other’s language. We both rely on computer translation programs. So do I really need to spend the airfare and hotel room cost to grip and grin in Sarasota this next summer? For me the answer is a definite yes. The convention offers far more than this machine on my desk or the tablet I sometimes carry could ever offer. Still, the pressures on the organization remain.

COA has seen membership average age increase while member numbers decline. Restrictions on collecting and habitat loss have made collecting trips more challenging. Shells are now available through a myriad of online auction sites. Yet today’s COA remains a vibrant organization dedicated to shell collecting, molluscan knowledge and research, and conservation; but if you think there were some changes in the last 40 years, just wait to see what happens in the next 40. The COA convention in Sarasota, Florida, on 16-21 July 2013, will undoubtedly be a grand affair - our 40th anniversary. We were there, in the same Hyatt Sarasota hotel, in 2002 and it was a great venue. So despite my fingertip connectivity, I plan on attending. An Internet auction does not really compare to the excitement of walking into the COA Bourse when it first opens and I very much enjoy seeing old friends and meeting new friends. See you there.

CONCHOLOGISTS OF AMERICA BULLETIN
VOL. 13, NO. 2 JUNE, 1985

First color cover for American Conchologist, June 1985, an oil painting, “*Cypraea guttata*,” by Patty McGeeney in the collection of Marty Beals.

Acknowledgements: The history reported here came mostly from *A Twenty Year History of the Conchologists of America: 1972-1991*, Special Publication 2, COA, by Lucy Clampit and edited by Lynn Scheu, Richard Goldberg, and Walter Sage.

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Ya'll Come to COA 2013!

Peggy Williams

The Sarasota Shell Club is pleased to host the COA Convention, which will be held July 17-21, with field trips on the 14th, 15th, 16th, and 21st. The venue is the same as when we hosted in 2002, the Hyatt House, right near downtown Sarasota. Room rates start at only $109 (there are lots of other hotels nearby).

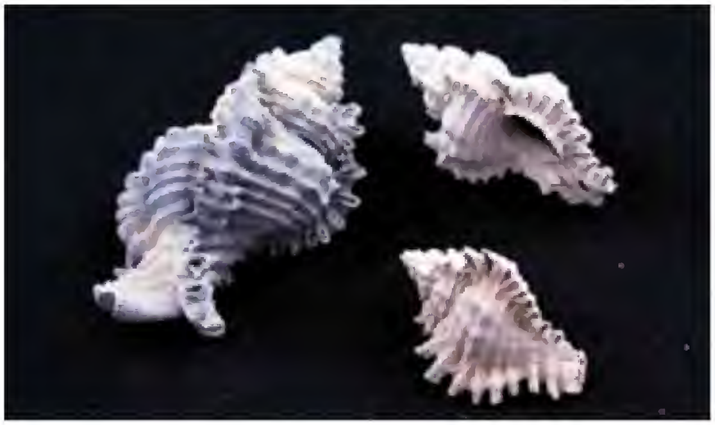
We have some exciting things planned for you. We'll have at least two fossiling trips, maybe three. We'll also have a scuba trip and snorkeling trip, as well as a wading trip on Friday evening the 19th.

Registration will start Tuesday the 16th at 1:00 PM and opening ceremonies will be at 10:00 AM on Wednesday the 17th. Those days we will have "cheap shells" - for 25¢ and 50¢ (and maybe even some free).

We'll have a registration form on the website soon. We hope you will all seriously consider coming!

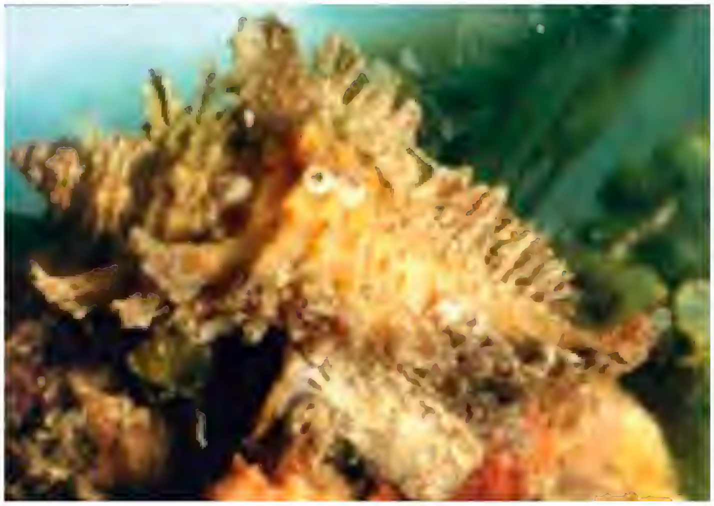
P.S. **If you have anything to contribute** to the Oral Auction, Silent Auction, Raffle, Door Prizes, or Cheap Shells, we'll be glad to have them. Send your contributions to Peggy Williams, PO Box 575, Tallevast, FL 34270 (US mail only) or Lynn Gaulin, 4407 33rd Ct E, Bradenton, FL 34203 (Fed Ex, UPS, or after Nov 1, 2012). A letter of thanks will be emailed to you for tax purposes.

(above): Meeting room. (below): *Chicoreus floridanus* Vokes, 1965, Cenozoic fossil found in the area.



(above): [Ed. comments] Pool at the Sarasota Hyatt where in 2002 they served a truly magnificent grouper sandwich.

Typical light and airy room. (below): *Chicoreus dilectus* (A. Adams, 1855) Recent species found in the area.



Vol. 40, No. 4, December 2012
thomas@nerita.com www.conchologistsofamerica.org

American CONCHOLOGIST

Quarterly Journal of the Conchologists of America, Inc.

CONCHOLOGISTS OF AMERICA, INC.

In 1972, a group of shell collectors saw the need for a national organization devoted to the interests of shell collectors; to the beauty of shells, to their scientific aspects, and to the collecting and preservation of mollusks. This was the start of COA. Our membership includes novices, advanced collectors, scientists, and shell dealers from around the world. In 1995, COA adopted a conservation resolution: Whereas there are an estimated 100,000 species of living mollusks, many of great economic, ecological, and cultural importance to humans and whereas habitat destruction and commercial fisheries have had serious effects on mollusk populations worldwide, and whereas modern conchology continues the tradition of amateur naturalists exploring and documenting the natural world, be it resolved that the Conchologists of America endorses responsible scientific collecting as a means of monitoring the status of mollusk species and populations and promoting informed decision making in regulatory processes intended to safeguard mollusks and their habitats.

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Front Cover: *Voluta musica* Linnaeus, 1758, photographed in the Caribbean off Union Island, the Grenadines, by Charles Rawlings in 2009. This image clearly demonstrates the shell markings responsible for the name "music volute" as well as the intricate markings of the living animal. A quick check of the WoRMS database (www: marinespecies.org) found 23 synonyms for this pretty little shell.

Back Cover: Here we have most of the attendees at the AMS/COA joint meeting and convention in Philadelphia. Paul Callomon has provided a key on page 35 to most everyone in the photograph.

Editor's comments: As we say goodbye to 2012 I would like to thank the many people who make this magazine possible. First are the contributors. Without our many talented and willing authors, this would be an extremely limited publication. As it is we have authors who write articles on systematics, natural history, conchological history, collecting expeditions, new shell discoveries, shelling trips, shell shows, and some topics less directly related to conchology but still of interest to our readers. I quite often begin the layout of the magazine convinced I will not have enough material for a complete issue, but it seems that someone always comes through with that critically-needed article and I can patch together another run. Thanks to all of you, and please, please keep our magazine in mind for your next shell piece. The last minute stuff is oh-so-welcome, but it could eventually lead to ulcers! I also thank the many people who have provided me with shell images over the years, such as the wonderful photographs by Charles Rawlings (e.g. the front cover of this issue).

After I have the magazine as ready to print as I can make it, I send off a copy to Bruce Neville at Texas A&M University in College Station, Texas. For about a decade now he has been reviewing each issue and not only correcting my lapses of English, but more importantly tracking down scientific names to ensure we print the correct name, the correct spelling of that name, the correct author, and the correct date. He also works diligently to keep our taxonomy updated and at least internally standardized. Thankfully Bruce is not only eminently qualified to provide this guidance, but he is a good enough friend to stick with what is truly an onerous task.

After Bruce sends me his corrections and suggested changes, I do another clean up of the magazine and send it electronically to our printer, JPA in Illinois. These good folks have not only cut the cost of the magazine in half, but they are always willing to help with technical questions and their turnaround time is always the minimum possible. This is also when I make a last minute email request to Steven Coker for money. He cuts the checks for postage and printing and gets them in the mail as if it was an emergency - which it almost always is as I tend to run late.

JPA mails a few copies to me and 1,200 (over 350 lbs) to Lynn Scheu in Kentucky. Lynn was editor for 16 years and did both my job and the one she does now. When she stepped down she agreed to continue to dedicate one complete weekend each quarter to unpack magazines, stuff envelopes, sort piles by zip code, and haul the resultant tonnage to the US Post Office. She and husband Richard respond each time as if *American Conchologist* is so important it has to go out immediately. Think about what you did last weekend and if you could or would have dropped it all to shuffle magazines.

Some others in this process, **every time**, are Doris Underwood who keeps the COA membership list up-to-date and mails Lynn the required labels, and Betty Lipe who stepped up to work with our advertisers and keep me apprised with what ads to print with each issue. We also have Tom Grace who collects and stores all extra copies. I do not know what to do with the few extras I get each time, I cannot imagine trying to store the thousands of copies in Tom's garage, basement, attic, and probably storage shed.

Finally, each reader gets his or her *American Conchologist* and if I am lucky they might see me at an annual COA convention and congratulate me on the magazine. Of course, I nod, smile, and say, "Thanks!" as if I had done it all - but now we all know the truth.

The labral tooth -- variations on a theme

Emily H. Vokes

Predatory snails generally have two ways of getting into a shell. Some drill a nice round hole and insert the proboscis into the victim and ingest the soft tissues, but this is very time consuming, taking hours or even days to complete. The second method is to enter the victim's shell through an existing opening, such as the aperture of a snail or the space between the two valves of a clam, but the victim may react violently by closing the aperture with the operculum or clamping the valves together. If the predator has already gained entrance the proboscis can even be severed, but if part of the shell can be wedged into the opening this will stop the closing. It turns out that a small tooth on the edge of the outer lip of the predator's shell is an effective tool to keep the opening from being closed. Obviously it is a trick worth developing.

I first became aware of the taxonomic value of the labral tooth while at the Australian Museum, working with Winston Ponder on the Indo-Pacific species of *Murex*. The first task he gave me was to describe each of the species in a detailed manner. To my surprise, as I worked through the approximately 40 species then referred to *Murex* s.s., a pattern appeared, separating them into two groups. One, true *Murex* s.s., was characterized by having nine angulate "proto-varices" on the earliest post-nuclear whorl, a markedly spinose shell, a monochromatic tan color, a smooth inner lip, and, most noticeably, a labral tooth. In contrast, the second group, which we referred to *Haustellum*, differed in having 12 rounded axial ribs on the earliest post-nuclear whorl, less impressive spines, color stripes, denticles on the inner lip, and no labral tooth.

Our work was published in the *Records of the Australian Museum* (Ponder and Vokes, 1988) and I further discussed this separation in "What ever happened to dear old *Murex*?" in *American Conchologist* (Vokes, 1990) wherein I pointed out that not only were about 25% of the Old World species formerly assigned to *Murex* s.s. not to be so classified, but that ALL of the New World species assigned to *Murex* s.s. should instead be assigned to *Haustellum*. Shortly thereafter, Houart (1992) separated the species of *Chicoreus* s.s. from those of *Triplex*, on the basis of the lack of a labral tooth in the latter. I could scarcely fault him, could I? Petuch (1994, p. 273) subsequently placed many of these "*Haustellum*" species into a new genus *Vokesimurex*, including all the New World ones.

Since that time Geraat Vermeij has become extremely interested in the development of labral teeth and together we did a study on the fossil and Recent western Atlantic Ocenebrinae (Vermeij and Vokes, 1997), many of which are characterized by the possession of a labral tooth. Vermeij continued his studies, following our work with a paper (Vermeij, 1998) describing the mode of formation of the tooth, including three new genera. This was followed by a major study on the origins and formation of the tooth (Vermeij, 2001), which is the basis of this article.

In this latter work on the development of the tooth he found that many different snail lineages have evolved a labral tooth. Every toothed species known is carnivorous. According to Vermeij (2001, p. 468) no herbivorous, detritivorous, or microphagous snails have a tooth. The muricids, being predatory snails, have the largest percentage, comprising half of the "clades," as Vermeij calls them. But there are several others, including the Buccinidae, Turbinellidae, and Fasciolariidae, one of which, *Opeatostoma pseudodon* (Burrow, 1815), has the largest and finest tooth of all. Curiously, this species feeds on polychaetes and the tooth is always sharp and unworn at the tip, indicating that it is not used to subdue prey.

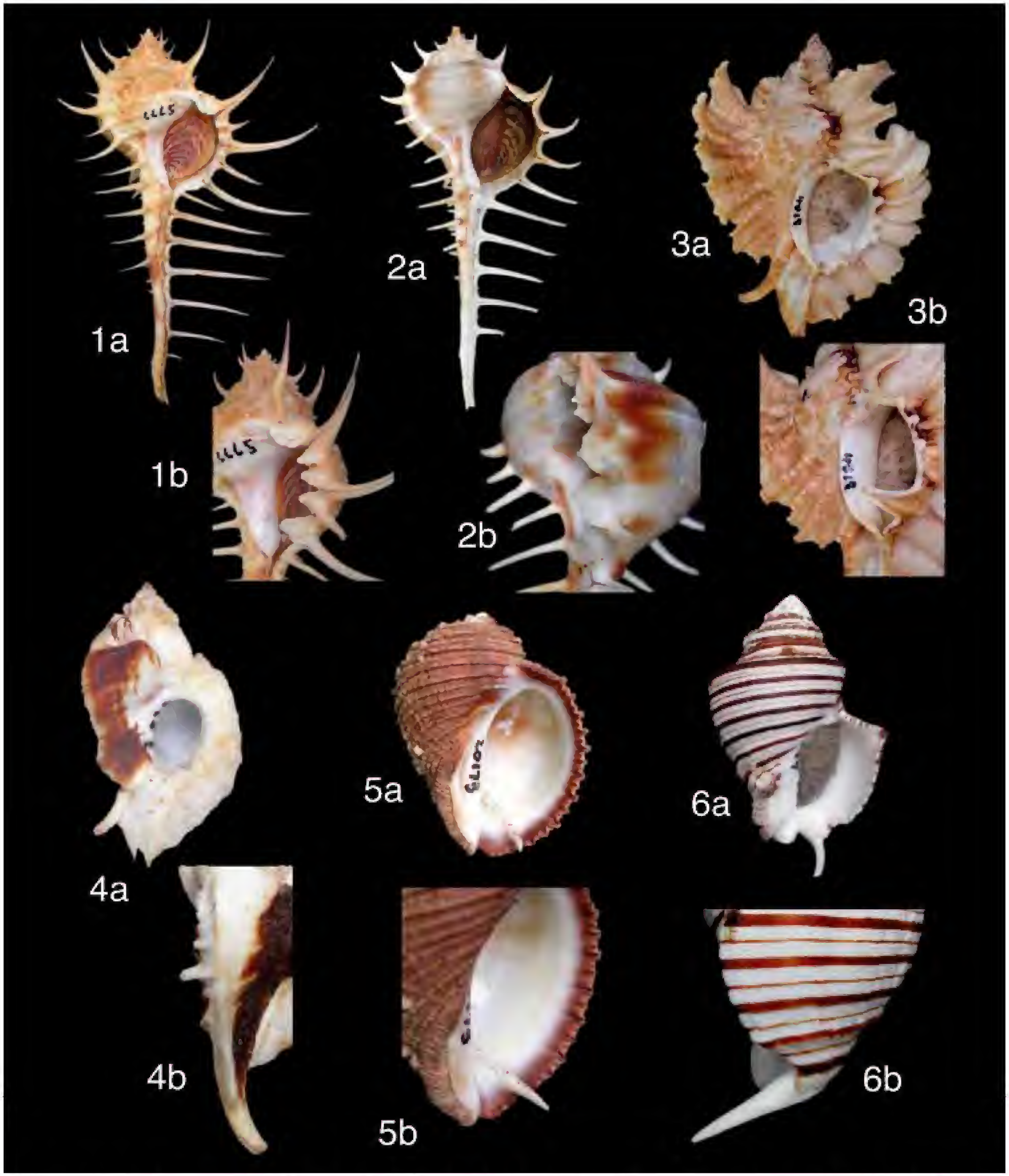
Vermeij has done almost all the work on labral teeth and in his 2001 *magnum opus* he determined that in the entire Neogastropoda there are at least 608 species, of which 251 are Recent, in which the tooth has appeared. But, what is even more critical, he states that the tooth has evolved **independently** at least 58 times! In the Recent fauna these tooth-bearing species are overwhelmingly warm-temperate to tropical in distribution, comprising 240 of 251 species, or 96%.

But as far as I am concerned the most interesting statistic is the preponderance of muricids. In all, 29 of the 58 tooth-bearing groups are muricid, including members of the Muricinae, Ocenebrinae, and Rapaninae. The other muricid subfamilies have no tooth-bearing species.

In terms of geologic time labral teeth first appear in the Late Cretaceous but are mainly concentrated in the Late Oligocene to Pleistocene interval, with the largest number appearing during the Early Miocene. For example, from the Late Oligocene to the Late Pliocene most muricid faunas in the Atlantic have at least two species with a labral tooth, and the Early Miocene Cantaure Formation of Venezuela, and the Pliocene Pinecrest Formation in Florida, have four species each. But there are no Pleistocene or Recent tooth-bearing muricids in the western Atlantic.

Morphologically, the evolution of a labral tooth is a simple matter. Just as spines are formed, the shell-producing mantle is extended to produce a projection. Perhaps because Muricidae are already genetically programmed to make spines, adding a tooth is a simple step. Vermeij has also documented (2001, pp. 464-466) the variations by which a tooth is formed. Although all are on the outer lip, they are not a uniform structure, but may develop in a variety of ways: 1) at the end of an external groove; 2) at the end of an external cord; 3) continuously, or, 4) discontinuously; 5) located anywhere from the upper end of the siphonal canal to about the middle of the lip.

In the Muricidae the most common type is at the end of a spiral groove, located near the siphonal canal. In most it is discontinuous, appearing only at the apertural face of a varix (*Murex s.s.*, *Chicoreus s.s.*, *Hexaplex*, *Ceratostoma*, *Pterorytis*). There are also species in which teeth on the varices appear discontinuously at the end of a spiral cord (*Jaton*, *Ocinebrina*), and there are



1. *Murex acanthostepes* Watson, 1883 -- Devil Brook, Western Australia. 2. *Murex somalicus* Parth, 1990 -- trawled between Cape Guardafui and Ras Hafun, northeastern Somalia. 3. *Ceratostoma burnettii* (Adams and Reeve, 1850) -- off northeast entrance to Puson Harbor, Korea Strait, divers in 50-80', South Korea. 4. *Jaton decussatus* (Gmelin, 1791) -- Goré Is., Senegal, West Africa. 5. *Acanthina monodon* (Pallas, 1774) -- Playa Larga, 2 km east of Arroyo Grande, Tierra del Fuego, Argentina. 6. *Opeatostoma pseudodon* (Burrow, 1815) -- Contadora Is., Las Perlas Archipelago, Panama.

species in which the tooth, usually a short blunt projection, forms continuously at the end of a spiral cord (*Muricodrupa*, *Nucella*).

As Vermeij notes, the labral tooth has been developed independently numerous different times and occurs in several different configurations. The question then becomes -- why have so many different groups independently come up with the same innovation at so many different times? According to Vermeij (2001, p. 480) the most consistent factor is high planktonic productivity. During times of high planktonic productivity, suspension-feeders such as bivalves, barnacles, and bryozoa, become abundant and large. It has been determined that peaks of first appearances of tooth-bearing groups coincide with times and places of high productivity. The more abundant prey available gives rise to the repeated development of the labral tooth in the predators. A novel structure like the labral tooth makes possible predation on larger, more protected prey (Vermeij, 2001, p. 483). Then escalation of the "arms race" between prey and predator fosters repeated evolution of the structure. The role of this "positive feed-back" in innovation is extremely important, but according to Vermeij "it remains an underappreciated aspect of biological evolution" (Vermeij, *ibid.*).

ACKNOWLEDGMENTS
I wish to express my deepest gratitude to Emilio Garcia for all his help, especially preparing the plate. To Geerat Vermeij, my thanks and that of all molluscan workers, for his seminal works on the underappreciated labral tooth.

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Still more on blood-sucking mollusks: a bivalve?

Tom Eichhorst

Zvi Orlin wrote "More on Blood-Sucking Mollusks" in the June 2007 issue of *American Conchologist*. In this article he discussed his fascination with mollusks that preyed on other organisms by actively sucking blood (Orlin, 2007: 23). He recounts *Cancellaria cooperi* Gabb, 1865, as perhaps the best known blood-sucking mollusk. An attractive nutmeg with a tan shell marked with dark brown spiral lines, it was first reported by O'Sullivan *et al.* (1987) as actively hunting out and attacking (sucking blood) the electric ray *Torpedo californica* Ayres, 1855. Other gastropods that actively parasitize fish in this manner include marginellids observed in the waters off New Caledonia preying on a number of different species of fish as reported by Philippe Bouchet (1989). Scott Johnson *et al.* (1995) observed both Colubrariidae and Marginellidae in the Marshall Islands actively feeding on sleeping fish during nighttime hours. Similar behavior involving non-piscine prey include Eulimidae feeding on echinoderms and Pyramidellidae feeding on bivalves and polychaetes (Bouchet, 2007). All of these predatory, blood-sucking mollusks are gastropods, which makes sense as such activity would seem to require mobility to hunt down and attack selected prey, even if said prey is asleep. The phylum Mollusca, however, seems a continuing source of surprises.

A small (less than 2 mm), deepwater (about 1280 m), blood-sucking bivalve was recently discovered in the Atlantic and given the apropos name of *Draculamya porobranchiata* Oliver & Lützen, 2011 (the Dracula clam). The holotype of this clam-like white (and almost featureless) shell can be seen at: http://naturalhistory.museumwales.ac.uk/molluscatypes/browserecord.php?-recid=383&-sortfieldone=TaxonomySort&-sortfieldtwo=&-skip=0 Although its feeding behavior was not observed, the authors infer a blood-sucking methodology because this bivalve lacks both gills (the ctenidia are reduced to numerous small pores) and labial palps - required to filter feed. Instead there is a modified alimentary tract that acts as a pump, an expanded stomach to hold fluids, and piercing organ at the end of the byssus groove (Oliver & Lützen, 2011). The actual method of feeding and the chosen prey are unknown.

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Report on a dredging expedition off the Louisiana coast, including geographical extensions and new record sizes

Emilio F. García

Last August Drs. Darryl Felder and Suzanne Fredericq, members of the Biology Department at the University of Louisiana at Lafayette, led a dredging expedition to the north central Gulf of Mexico. The expedition was labeled "Gulf of Mexico Research Initiative" and was part of a study project to assess the impact of the Deepwater Horizon oil spill in the surrounding marine biota. A preliminary assessment on the mollusks was reported in *American Conchologist* (2012a). The expedition was sponsored by British Petroleum, and its Primary Investigator was Dr. Nancy Rabalais, Executive Director and Professor at the Louisiana University Marine Consortium, Chauvin, Louisiana.

The dredging equipment consisted of two benthic skimmers, which are large dredges specially designed for the very soft mud bottom found in deep water (see García, 2007b) and three box dredges used for the harder coralline tops of the banks or "pinnacles" that occur in the northwestern Gulf. The plans were to use the skimmer, going east from the Mississippi Delta in roughly 30 m, 100 m, 200 m, and 500 m, then sail to the east side of the Macondo Platform where the spill occurred; work the area; and ultimately sail our way back to the offshore Louisiana "pinnacles," where the box dredge would be used. This was to be done in a five-day period (August 24-28), with the expectation that we might have to cut the trip short due to hurricane Isaac, which was heading somewhere into the Gulf. Well, as it turned out, the hurricane was going to be the least of our problems.

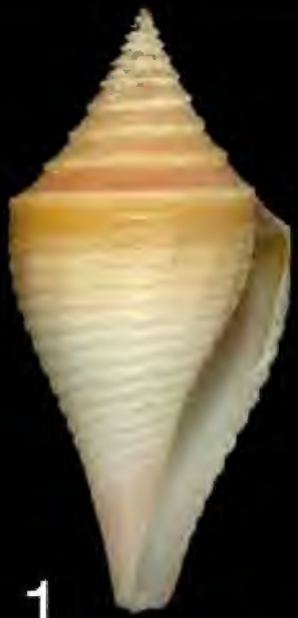
As usual, the *R/V Pelican*, our vessel, left port one minute after midnight and by 5 a.m. we were *in situ*, dredging at our first station in 27 to 28 m of water (28°44.76'N, 90°14.15'W) in rubble. The results were rich in living mollusks, including *Lirophora clenchi* (Pulley, 1952); *Distorsio clathrata* (Lamarck, 1816); *Solenosteira cancellaria* (Conrad, 1860); *Oliva sayana* Ravenel, 1834; *Conasprelloides cancellatus* (Hwass, 1792); and single or double specimens of *Architetonica nobilis* Röding, 1799; *Tonna galea* (Linnaeus, 1758); *Terebra taurina* (Lightfoot, 1786); *Drillia wolfei* Tippett, 1995; and *Calliostoma yucatecanum* Dall, 1881. One of the juvenile specimens of *Conasprelloides cancellatus* **(Fig. 1)** showed a yellow band on the shoulder when the periostracum was removed, a character I had seen in specimens from the southern Caribbean, but not from the Gulf. The single live specimen of *Calliostoma yucatecanum* that was dredged **(Fig. 2)** is unusually colorful and seems to be a record size for the species at 17.9 mm. Malacolog reports the largest recorded size as 16 mm (Rosenberg, 2009). *Drillia wolfei* **(Fig. 3)** had been recorded from Bahía de Campeche in the southern Gulf (García, 2007a), but had not been reported from the northern Gulf. Besides the two specimens dredged on this trip, in 1996 the species was dredged, but unreported, off Louisiana, in 68- 104 m (EFG 28073).

We had problems with the benthic skimmer at Station 2 (at 100 m) because there were issues with the harness as it was being lowered, and it came up empty. Well… almost. One lump of mud left in the dredge turned out to be an empty *Hindsiclava alesidota* (Dall, 1889). Station 3 (28°37.9'N, 89°46'W; in 200 m) more than made up for it. The dredge brought up many fish and crustaceans as well as numerous *Polystira tellea* (Dall, 1889). It also brought up an empty but rather fresh specimen of *Periploma orbiculare* (Guppy, 1882) measuring 28.9 mm **(fig. 4).** Guppy's taxon had been ignored for many years until it was examined and discussed by Huber (2010: 783).

Huber placed *Periploma orbiculare* in synonymy with *P. coseli* Ardila & Díaz, 1998, a taxon which, like *P. orbiculare*, was known only from the southern Caribbean. Then an empty but complete specimen was dredged in Bahía de Campeche in 2005 (EFG 26044; 20°46.97'N, 91°55.86'W, in 28-48 m, in mud) and in 2011 another empty but complete specimen was dredged off the Alabama coast (EFG 30167; 29°24.724'N, 87°58.597'W , in 73-76 m). These records have been unreported until now. *Periploma orbiculare* has also been reported from the Texas coast (Tunnell *et al.*, 2010: 337), apparently from a single drilled valve, even thought it was reported as a "live specimen." The depth at which the specimen was collected (3 m) also suggests this was not its natural habitat, as all other Gulf specimens have been collected at much greater depths. The same Station 3 also brought up live *Aequipecten glyptus* (A. E. Verrill, 1882), *Scaphella dubia* f. *kieneri* Clench, 1946 **(fig. 5),** and a beautiful specimen of *Pteropurpura bequaerti* (Clench & Pérez-Farfante, 1945) measuring 60 mm **(fig. 6)**, which also seems to be a record

Moving to the next station the dredge was dropped at 500 m, but got caught at the bottom and was lost. Not wanting to risk losing the second dredge in the same spot, we decided to make the long run to the east site of Macondo, the Deepwater Horizon oil spill area. It was a big blow to everyone when soon after dropping the skimmer at our intended station it was also lost. We had never lost a single benthic skimmer before; not a one. We were left with no choice but to start our long run back to the shallower hard pinnacles of Louisiana.

The disappointing results of our dredging experience on the August 2011 expedition to Sackett and Ewing Banks, off the Mississippi Delta, have been published in this magazine (García, 2012a, 2012b). Unfortunately, we did not do better in August 2012. Most worrisome was the fact that the algae on top of the banks did not seem to have been able to recuperate. It was worrisome because in August 2011 my colleague, Dr. Fredericq, had taken rocks from both banks to her lab at the university and in a few weeks a healthy crop of several species of algae was taking over the aquaria. What was preventing the algae from also growing in the wild one full year later? A rhetorical question at this point, but Dr. Nancy Rabalais and Drs. Fredericq and Felder are working on this dilemma.



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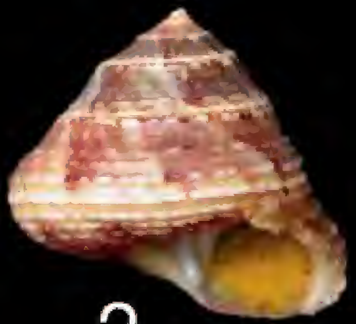

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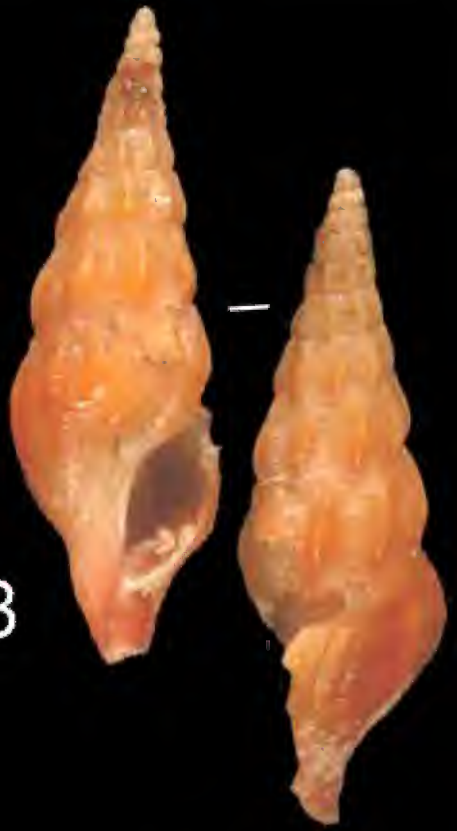

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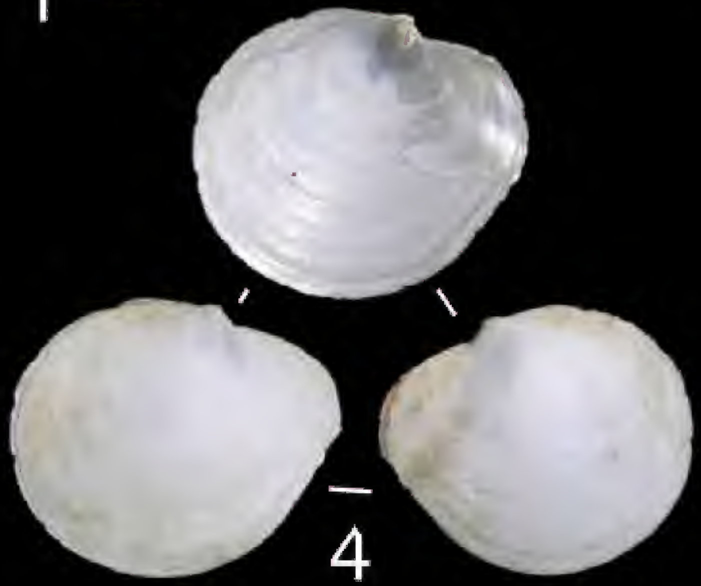

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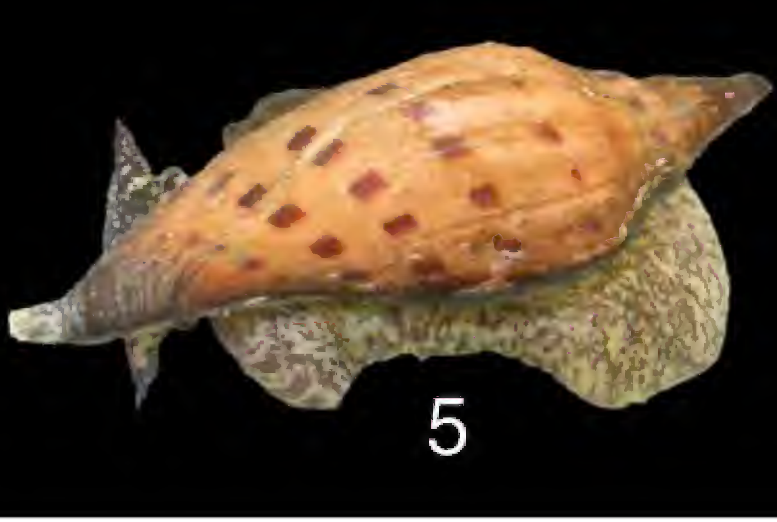

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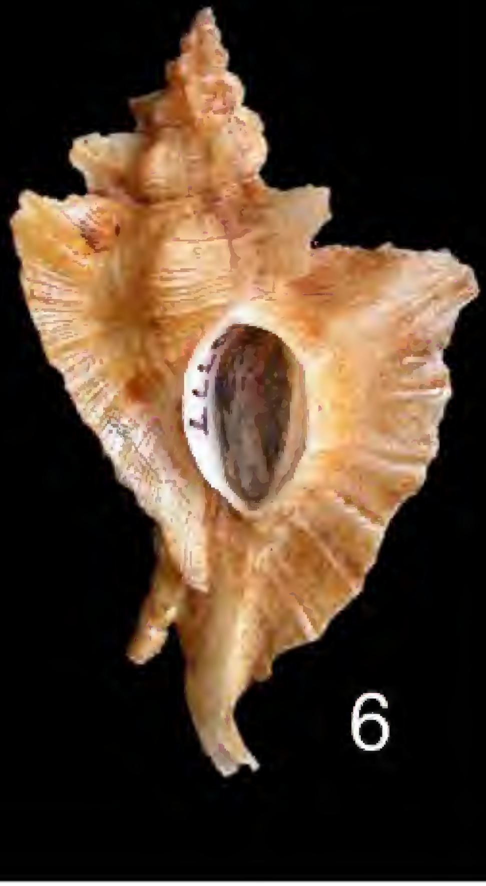

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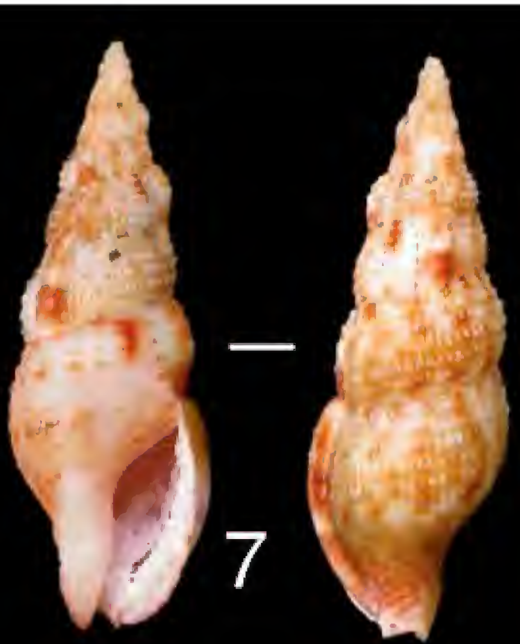
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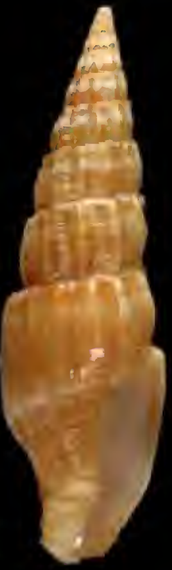
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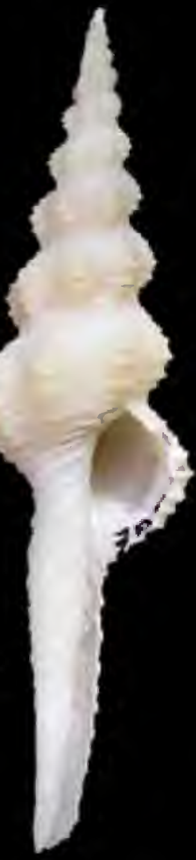
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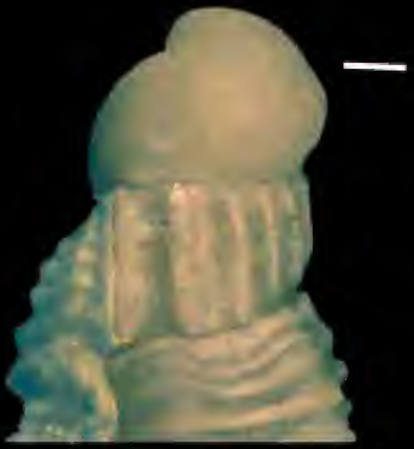

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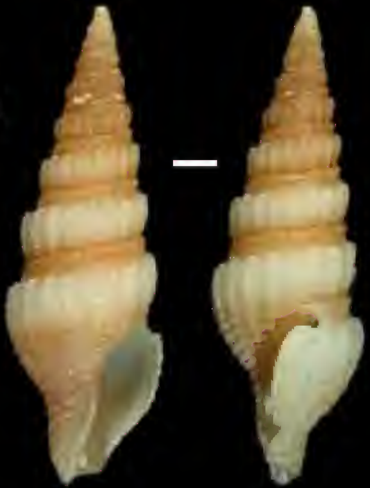

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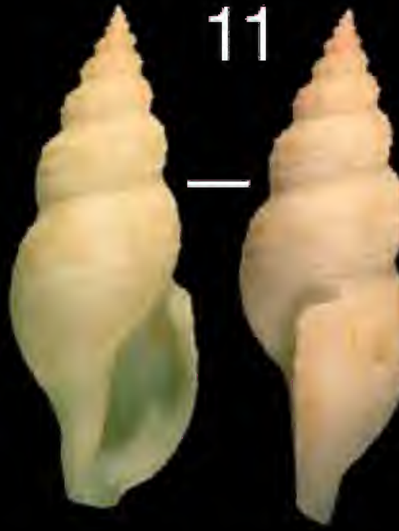

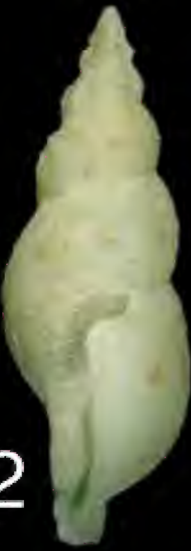
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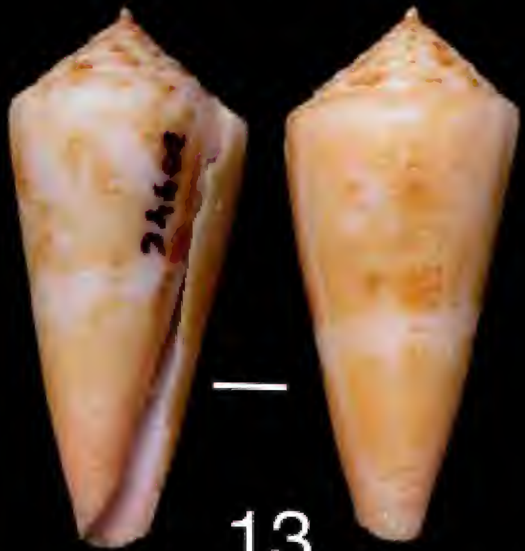
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August 26 was spent busily dredging Sackett and Ewing Banks as well as other banks to the west of them that we had not expected to visit, but after our mishaps we now had some extra time. Twelve stations were logged on August 26. We hoped there would be improvement in the biota of the banks as we moved west, but the improvement was barely noticeable. Under the column for Mollusca I catalogued only twenty-one lots from these twelve stations. The species catalogued do not include the only two gastropod species that we consistently saw alive, *Turbo castanea* Gmelin, 1791, and *Erosaria articularis* (Gmelin, 1791), or the few live *Acrosterigma magnum* (Linnaeus, 1758), *Globivenus listeroides* (Fischer-Piette & Testud, 1967) and *Semele purpurascens* (Gmelin, 1791). Not all was lost, however, if we consider the empty specimens. (Yes, my colleagues were very jealous because I could collect skeletons).

Among the interesting single, empty specimens collected on the Louisiana banks were the following:

Colubraria testacea (Mörch, 1874) **(Fig. 7)**; 27°59.189'N, 91°39.466'W to 27°59.106'N, 91°39.156'W; in 77-79 m, in rubble. This species has been reported from three quadrants in the Gulf of Mexico, including the northwestern quadrant (Rosenberg et al., 2009). It is listed here because the specimen measures 54.8 mm, a large size for the species.

Vexillum cf. V. hendersoni (Dall, 1927) **(Fig. 8)**; 27°59.28'N, 91°39.28'W to 27°59.34'N, 91°39.15'W; in 77-79 m, in rubble. This specimen is narrower than, and of different coloration from, all other *V. hendersoni* I have seen, including a number of lots dredged off Louisiana; otherwise, it does seem to conform to the characters of *V. hendersoni*. It measures 15.6 mm.

Fusinus cf. F. halistreptus (Dall, 1889) **(Fig. 9)**; 28°37.750'N, 89°34.703'W to 28°37.850'N, 89°34.010'W; in 100 - 85m. Similar to Dall's taxon but with a wider shoulder and fewer axial ribs, it is the second such specimen collected off Louisiana, 65.6 mm.

Pyrgospira cf. P. ostrearum (Stearns, 1872) **(Fig. 10)**; 27°57.718'N, 92°00.239'W to 27°58.339'N, 92°059.814'W; in 92-105 m, in rubble. The generic placement was suggested by Phil Fallon. It may be an aberrant form of *P. ostrearum*, but I have two other similarly colored specimens from other Gulf stations, including one from Bahía de Campeche, Mexico, which would make the synonymy harder to understand. The specimen, a sub-adult, measures 17.5 mm. The other two lots are single juveniles.

Eucyclotoma cingulata (Dall, 1890) **(Fig. 11)** ; 27°57.718'N, 92°00.239'W to 27°58.339'N, 92°059.814'W; in 92-105 m, in rubble. I was very pleased and surprised when this specimen came up in the dredge. Although I have a number of lots of this species from Bahía de Campeche, I did not remember collecting it from the northern Gulf, but after checking my collection I did have a juvenile dredged off Alabama in 2006 (EFG 27805; 29°24.43'N, 87°58.63'W, in 74-72 m, in mud). What makes this specimen more remarkable is that it measures 23.5 mm, almost as large as one of the specimens from Bahía de Campeche, which measures 24.7 mm **(Fig. 12)**.

Dauciconus aureonimbosus (Petuch, 1987) **(Fig. 13)**; 28°05.826'N, 91°01.555'W to 28°05.912'N, 91°01.849'W; in 56-53 m, in rubble. Mr. John Tucker identified as Petuch's taxon two calcified specimens collected during this trip. The specimen shown in this plate (EFG 30446) was collected during the August 2011 trip and I had identified it as *Dauciconus amphiurgus* (Dall, 1889). This specimen measures 34.3 mm, larger than the maximum reported size of 27 mm that appears in Malacolog (Rosenberg, 2009).

So, all in all, it wasn't too bad for "discoveries" for two days of dredging; that is, if we count the skeletons. If the situation on top of the offshore banks does not change, even the skeletons will not be there.

My thanks to Drs. Nancy Rabalais, Darryl Felder and Suzanne Fredericq for once again inviting me to accompany them on another "Pelican" campaign.

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COA *Neptunea* Award

Many of us are beginning plans for the 2013 COA Convention in Sarasota, FL. One of the many events on the agenda is the annual COA *Neptunea* Award(s), and it is once again my privilege to call for nominations.

The consensus of the COA Board is to reopen nominations with a "clean slate" annually. Nominees not selected in previous years are certainly welcome for consideration if renominated - in fact their renomination is encouraged. For the present cycle, nominations will close on June 1, 2013, so as to allow ample time for deliberation before the convention.

By way of background, the *Neptunea* Award (Brunner, 2000; Lipe, 2000) was established at the midyear (1999-2000) meeting of the COA Board in order to recognize outstanding and distinguished service to conchologists and malacologists in recognition of:

1. Service to the Conchologists of America.

AND/OR

2. Service to the scientific interests of Conchologists of America.

AND/OR

3. Service to the science of malacology as it applies to conchologists anywhere.

Although notable exceptions have been made, the COA Board, which serves as the jury for the *Neptunea* Award, has traditionally weighed its consideration for award recipients toward (1) amateurs: those not currently pursuing a principal career involving collection, study, or commerce involving mollusks, (2) individuals "working behind the scenes" and relatively unrecognized, in the COA world, for their contributions, and (3) active members of the COA. Up to three awards have been made at our annual conventions beginning with the Houston event in 2000 (see below). Nomination(s) for the *Neptunea* Award may be made by any COA member, and the format is simple:

Name of nominee:

This person deserves this award because (here a somewhat detailed paragraph will suffice).

..... Signed ....

And either snailmail or email that nomination to the COA *Neptunea* Award Coordinator.
[currently Harry. G. Lee / 4132 Ortega Forest Drive / Jacksonville, FL 32210 / shells@hglee.com]

Previous *Neptunea* Award winners:

2000 (Houston, TX): Ross Gunderson, Ben and Josy Wiener, Debbie Wills

2001 (Port Canaveral, FL): Emilio Garcia, Harry Lee, Lynn Scheu

2002 (Sarasota, FL): Richard Petit, Bernard and Phyllis Pipher

2003 (Tacoma, WA) Jim and Linda Brunner, Kevin Lamprell, Doris Underwood

2004 (Tampa, FL): Bobbi Houchin

2005 (Punta Rassa, FL): Richard Forbush, Anne Joffe, William Lyons

2006 (Mobile, AL): Jack Lightbourn, Betty Lipe

2007 (Portland, OR): none given

2008 (San Antonio, TX): Bill Frank, Archie Jones

2009 (Clearwater, FL) none given

2010 (Boston, MA): none given

2011 (Port Canaveral, FL): Alan Gettleman

2012 (Cherry Hill, NJ): Gary Rosenberg, Martin Avery Snyder

Brunner, L., 2000. The *Neptunea* Award. *American Conchologist 28*(3): 3. Sept.
Lipe, B[etty], 2000. Presidents Message. *American Conchologist 28*(4): 2. Dec.

Harry G. Lee
Vice President, Conchologists of America
Submitted 23 September, 2012

COA grantees at the AMS/COA meeting

Paul Callomon

The AMS/COA meeting in June 2012 saw the coming together of many old friends and the first meeting of many new ones. United by their enthusiasm for all things molluscan, hard-headed molecular systematists could be seen discussing fine points of shell sculpture and shape with veteran snorkelers and hotel-room specimen triage experts. Scientists from all over the globe chewed the fat with dealers, collectors, and students, and evening bar tabs reached Rabelaisian proportions.

Over the eight days of the meeting the formal talks ran the gamut from the slugs of Pennsylvania to the Vermeij Crushing Analysis, and everything in between. Among the many symposia and activities, however, perhaps the most memorable was the joint session of presentations by former recipients of COA grants that took place on Wednesday and Thursday, June 20-21.

The COA grant program was established in 1985 and has made awards every year since then. The program has grown over the years so that for the last decade COA has been able to provide grants totaling $15,000 per year. Grantees are mostly graduate students and many have gone on to become leading professionals in the field. A large number gathered in June to present their work. Symposium chairs (themselves grantees) Ellen Strong of the Smithsonian and José Leal from the Bailey-Matthews Shell Museum called things to order at 8:20 and the day's program proceeded as follows:*

Rüdiger Bieler: Beauty and the Beast – diversity, research history, and ongoing challenges in two families of marine gastropods, Architectonicidae and Vermetidae.

Desmond Ramirez & Todd H. Oakley: Characterizing the molecular basis of dispersed photoreception in the cephalopod *Octopus bimaculoides.*

M. Sabrina Pankey & Todd H. Oakley: A phylogenetic and transcriptomic study of convergent evolution in bioluminescent squids.

Anita J. Krause & Jeanne M. Serb: Do scallops see in color? Understanding the visual capabilities of scallops.

Paul Harnik: Biological determinants of extinction risk in the marine bivalve fossil record.

Christy C. Visaggi & Patricia H. Kelley: Equatorward increase in naticid gastropod drilling on bivalves across four ecoregions in Brazil.

Russell Wyeth: Possible alternative strategies for nudibranchs navigating in variable flow.

Gregory B. McCullagh, Cory Bishop & Russell C. Wyeth: The rhinophores are sufficient and necessary during odor-gated rheotaxis in the nudibranch *Tritonia diomedea.*

James M. Newcomb: Developing a model system for investigating how circadian clocks produce circadian behavior.

Manuel António E. Malaquias: How can extant species of molluscs help us understand the evolution of life on Earth?

Melissa A. Frey, Geerat J. Vermeij & Thomas Eichhorst: Diversity and diversification in a group of tropical gastropods (Genus *Nerita*).

Erin L. Meyer: Habitat preferences and intertidal zonation of *Cittarium pica*: what rocks their world.

Nathan Whelan: Systematics and egg laying evolution of Pleuroceridae (Gastropoda: Cerithioidea).

Serena Ciparis, William F. Henley & J. Reese Voshell: Description of gonad development in a pleurocerid snail (*Leptoxis carinata*).

Kenneth A. Hayes: Conchologists of America: fostering the future of Malacology and supporting student research through grants to Malacology.

Kevin J. Roe: Investigations into the systematics and conservation genetics of freshwater mussels.

Christine E. Parent: Galápagos bulimulids: diversification amongst a vanishing tribe.

Dan Chang, Amy M. Olenzek & Thomas F. Duda Jr.: Geographic mosaics in biotic interactions drive evolution: patterns of variation of venom genes tightly associated with prey diversity.

Things continued on Thursday morning:

Elizabeth K. Shea: Structure and function of the fused tentacles in ommastrephid squids: dissertation research funded by the Conchologists of America.

Ilya Tëmkin: The Pterioidea: diversity and disparity.

Jeremy S. Tiemann: Damn those dams - their negative effects on stream ecosystems.

Josh R. Auld: The role of predation risk in mating system expression: avoiding inbreeding when death is on the line.

Aaron B. Stoler & Rick Relyea: The influence of litter species, chemistry and diversity on snail communities.

Norine W. Yeung & Kenneth A. Hayes: Hawaiian land snail biodiversity: conservation status of a vanishing fauna.

Wallace M. Meyer III and Robert H. Cowie: Land snail compositional changes and the functioning of ecosystems.

Paul Callomon
callomon@ansp.org

(Back cover) The official group picture – see how many faces you can name without using the key on page 35.

---

*The program and abstracts of all the talks at AMS/COA 2012 are available for download from the AMS web site:
http://www.malacological.org/meetings/archives/2012/Program_and_abstracts_FINAL_07Jun12.pdf

1. A mystery bivalve is debated by (left to right): John Taylor (Natural History Museum, London), Tom Waller (Smithsonian), Matt Blaine, and Doug Wolfe.

2. Liz Petit (right) prepares for a long session as Guido Poppe (left) and Dick Petit (middle) get started!

3. Coffee break with (left to right): Adam Baldinger (MCZ, Harvard), Phil Dietz, and Art Bogan.

4. COA President Alice Monroe (left) with a smile that says, "My term of office is complete" and COA Convention Coordinator Anne Joffe (right) with a smile that says, "The next two convention sites are a lock!"

5. Despite careful planning and event coordination that pretty much went without a hitch, transportation delays seem unavoidable.

6. Carole Marshall with Paul Valentich-Scott, Curator at the Santa Barbara Museum and co-author (with Gene Coan) of the new "Bivalve Seashells of Tropical West America."

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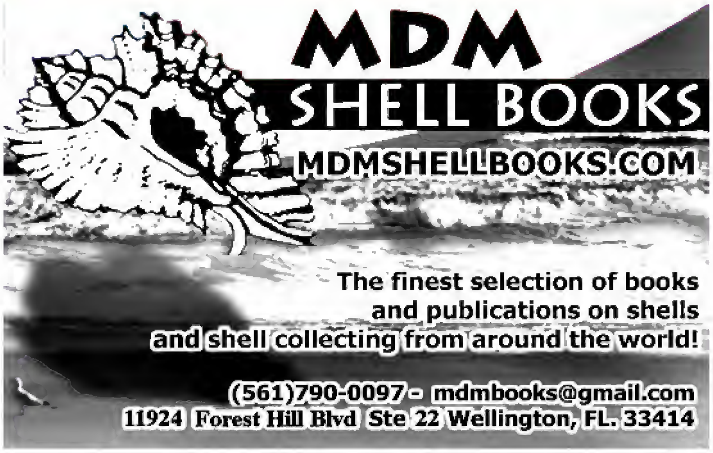
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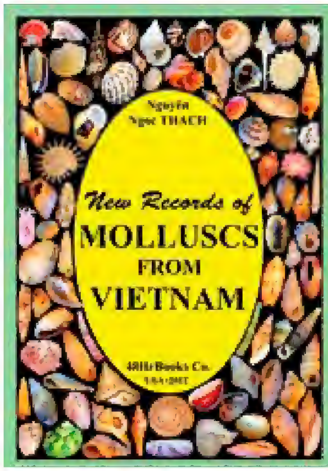

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The 2012 Philadelphia Shell Show

Paul Callomon

The Philadelphia Shell Club presented the 29th Philadelphia Shell Show over the weekend of October 20 and 21, while Hurricane Sandy was still but a wisp out in the Caribbean. Despite a gorgeous day outside and a packed social calendar in the city, over 2,600 people came to the Academy of Natural Sciences to marvel at the wonders on display. This year's show took place partly in the Academy's Ewell Sale Stewart Library, where the high windows provided dramatic natural lighting for both fortuitously sunny days. Portraits of conchological greats including Thomas Say and Isaac Lea gazed approvingly down on this modern-day display of the "citizen science" whose development they did so much to encourage.

Thomas Say
The Bicentennial Award
Commemorating Two Hundred Years of Conchology in America
1812
2012
Presented by The Philadelphia Shell Club

The Bicentennial Award featuring the likeness of Thomas Say, a charter member and founder of the Academy of Natural Sciences. He is best known to conchologists because of his work with North American land and freshwater mollusks. He is perhaps more widely known as an entomologist: describing over 1,000 beetle species alone.

Scientific classes

The scientific displays were among the best we've ever seen. Several were what are termed "curvature-of-the-earth" exhibits, grand spreads of impressive size, while others crammed the same levels of detail and scholarship into more modest dimensions. Judges Harry G. Lee and Rich Goldberg had the hardest time of all choosing the "shell of the show," as almost every exhibit had at least one in the running. They settled (finally) on Tom Grace's fine *Calliostoma schroederi* for "Any Source," and Ed Shuller's *Conus tranthami* for "Self Collected."

The year 2012 marks the 200th anniversary of the founding of conchology in the Americas with the establishment of the Academy of Natural Sciences by Thomas Say and several other Philadelphians. To mark the occasion, the Philadelphia Shell Club presented a one-off Bicentennial Award bearing Say's likeness to the best exhibit on the show theme "Shells of the Americas." Darlene and John Schrecke of North Carolina landed the award with their great work "Seashells from the Northwest Atlantic region."

Artistic classes

Philadelphia is justly known as a "Valentine Show," but alongside the usual dazzling display of octagonal artistry many other genres were represented by some very fine work. Hatsue Iimuro and Yasu Suzuki carried two magnificent pieces all the way from Japan, and rightly clinched the "Best in Show" (non Valentine) title for their "Shell Forest." The art of shell flowers was well represented, as were mosaics and shell pictures. Standards of execution were high in all genres and many competitors showed off imaginative new uses for familiar shells.

Competition was fierce among the valentines in several classes and some joint firsts were awarded. At some points it took all the skill and experience of judges Anne Joffe and Hannah Milman to reach a consensus. Several visiting experts over the weekend lauded the high level of innovation this year, with wires, mirrors, and multiple tiers employed to produce dramatic new effects.

The Bourse and Academy

The bourse dealers outdid themselves in putting on a great display and traffic was gratifyingly steady over both days. On various floors the Academy expanded on the show with activities for kids and families including squid dissections, movies in the auditorium, touch tanks, and craft tables. Bill Jordan once again gave packed master classes in valentine building and shell crafts.

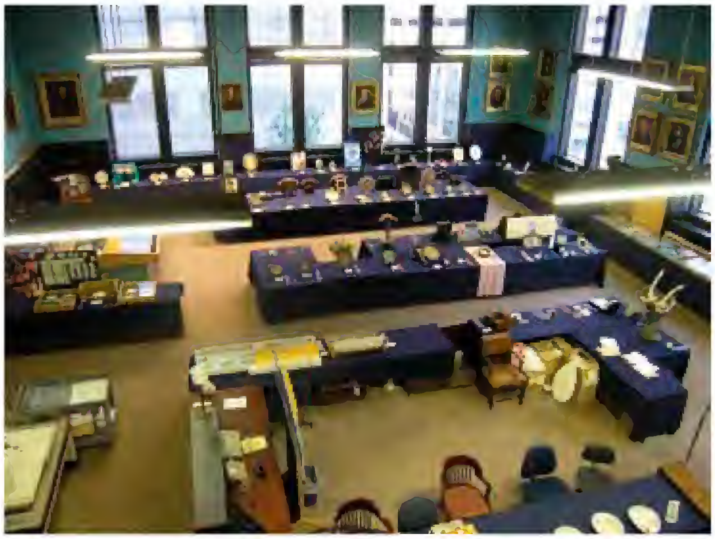
The Saturday evening Awards Ceremony and Supper were well attended, with revelry continuing long afterwards at several local establishments. Sunday saw no let-up in the stream of show-goers, who were snapping pictures and poring over captions right up to the last minute. Malacology Department staff gave tours of the Academy's vast shell collection three times each day and as usual they were fully booked. The 2013 Philadelphia Show will take place at the Academy on October 19 and 20, with setup on the 18th.

Acknowledgments

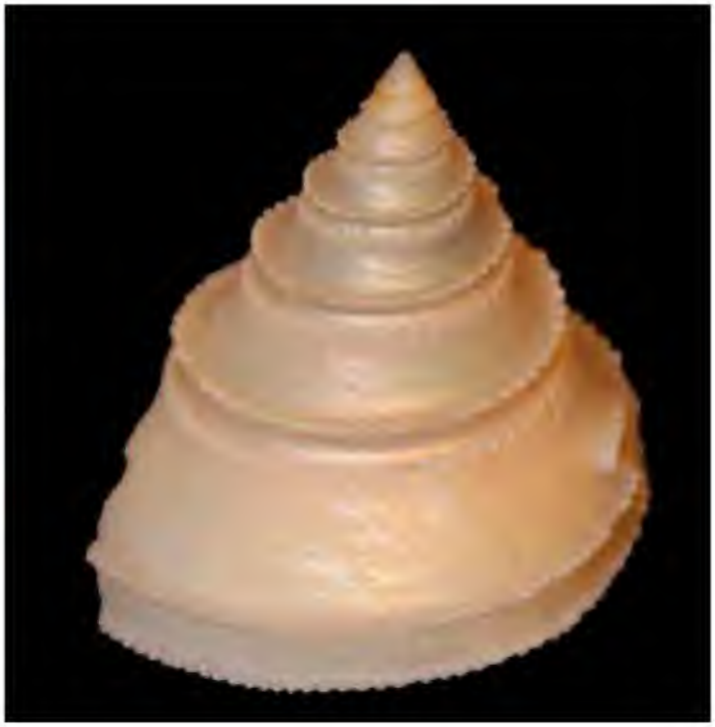
The Philly Show is a joint production of the Philadelphia Shell Club and the Academy's departments of Malacology, Education and Marketing, all of whom put on a major effort starting

The bourse, ready for a crowd of buyers and folks just wanting to look.

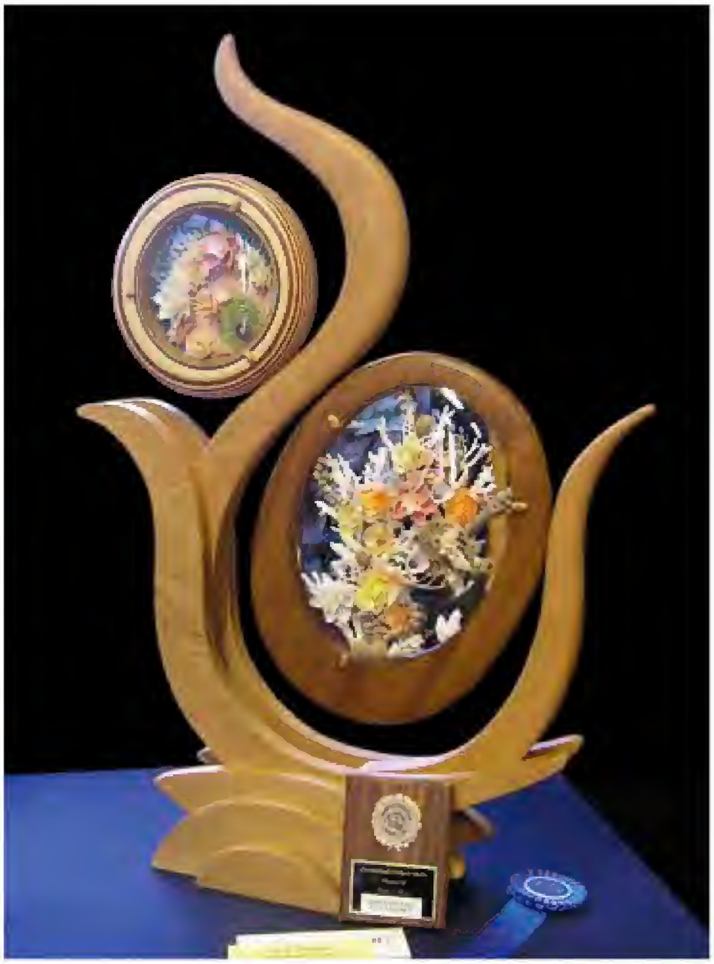
Harry Lee (left) and Robert Robertson (right) catch up on developments in the fast-moving world of malacology



The artistic classes in their distinguished surroundings, the Academy's Ewell Sale Stewart Library.



Shell of the Show *Calliostoma schroederi*, exhibited by former COA President, Tom Grace.



"Shell Forest" by Hatsue Iimuro and Yasu Suzuki of Japan understandably won the "Best in Show" (non Valentine) title.

An example of the sterling quality of scientific displays at this year's show.

many months ahead of the date. This year there was particularly effective promotion in the local media and the show saw a large jump in visitor numbers over 2011.

Planning and setup: J. B. Sessoms, Al Schilling, Michelle Morici, Anthony Paino, Amanda Lawless, Tommy Thompson, Judy Goldberg, Alex Moede, Nick and Betty Ruggeri, Francisco Borrero, Makiri Sei, Mike Beers, Richard Kaplan, and Bruce Tepper.

Hosting: Mary-Jane Schilling, Happy Robertson, Gary Rosenberg.

Promotion and media: Teri Scott, Carolyn Belardo, Mike Gage, Tom Eichhorst.

List of major scientific awards

Best Shell of Show, any source: *Calliostoma schroederi*, Tom Grace.
Best Shell of Show, self-collected: *Conus tranthami*, Ed Shuller.
John Dyas Parker Award for most creative scientific exhibit: Sheila Nugent, "Native Americans – the first collectors."
Robert B. Fish Award for best small scientific exhibit: Vicky Wall, "Self-collected shells from Hawaii."
R. Tucker Abbott Award for best scientific exhibit by a Philadelphia Shell Club member: Tom Grace, "American Calliostomatidae."
Leonard Hill Award for the most aesthetic scientific exhibit: Al Schilling, "Shells of the Americas."
Judges' special awards: Rich Kirk, "Shells from Antarctica" and Clare Horner, "Out of Africa."
2012 Bicentennial Award for best exhibit on the theme "Shells of the Americas": Darlene & John Schrecke, "Seashells from the Northwest Atlantic region."
Conchologists of America Award: Tom Grace, "American Calliostomatidae."
DuPont Trophy: Ed Shuller & Jeanette Tysor, "Pickups from the Oyster Bar in North Carolina."
Masters' Trophy: Gene Everson, "The Veneridae."

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Creature feature

Dan Dourson

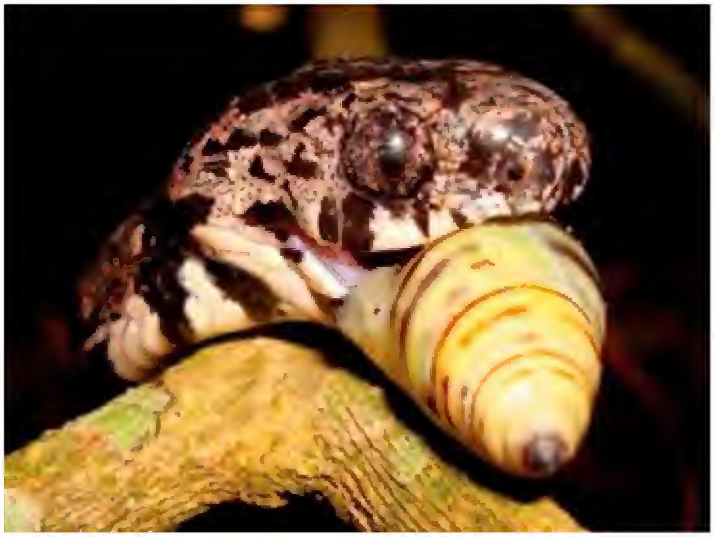
(reprinted with the author's permission from the October 2012 online BFREE Newsletter (Belize Foundation for Research and Environmental Education) http://www.bfreebz.org)

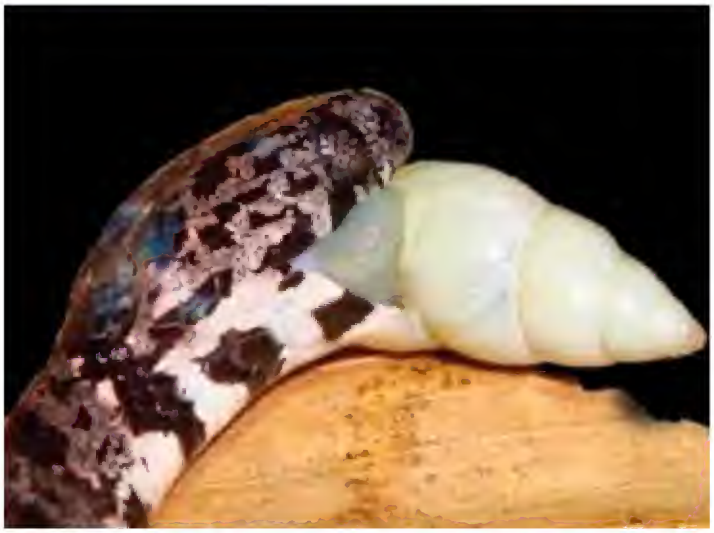
This article is an excerpt from Dan Dourson's latest book, "Biodiversity of the Maya Mountains with a focus on the Bladen Nature Reserve, Belize, Central America." The book also contains a comprehensive section on common and newly discovered land snails, some never before photographed. He is currently working on "Land Snails of Belize," which will hopefully be published sometime in 2013. This manuscript will be fully illustrated and contain more than 30 undetermined species, many of which are likely new to science. Dan is the resident biologist at the Belize Foundation for Research and Environmental Education.

When my wife and I first came to BFREE in 2006, my primary research focus was the study of land snails. I will never forget Jacob's reaction when I told him I studied snails. The smirk on his herpetologist face said it all. Then I began to study the interspecies relationships of snails and other organisms, like this month's Creature Feature, Speckled Snail-sucker, *Sibon nebulata*. The lowly snails started to gain his respect, if only to serve as dinner for his favorite group of organisms, snakes. The article below describes the amazing art of snail-sucking.

Presented here are observations I made in 2009 (with additional observations by filmmaker Richard Foster) of eight individuals of the species *Sibon nebulata* - Speckled Snailsucker, documenting the foods accepted and rejected by this species. Although the behavior witnessed for *S. nebulata* was based on a meager 25 feeding events, certain characteristics appeared, especially when the snakes fed on land snails in the genus *Drymaeus*. For example, before making grabs for the snail flesh, *S. nebulata* make deliberate and calculated assessments of prey size, movement, and position.

If the snail is on the move, the snake uses its tongue to delicately touch the snail, stopping all movement forward (personal communication - Richard Foster 2012). Occasionally the snail withdraws into its protective shell, but the snake simply waits with great patience until the snail reemerges. At this point, the snake begins to hover over the snail turning its head in contorted angles as it searches for an ideal strike angle, being careful not to make premature contact with the gastropod. Next the snake aligns its lower jaws with the lower opening of the snail aperture (this taking a few minutes). A strike then follows with the precision of a thread passing through the eye of a needle. Only the lower mandible of the snake enters the aperture while the upper mandible comes to rest on the outer surface of the last body whorl of the shell. Without delay, the snake makes a few lower and upper mandible adjustments before seizing down on the live snail flesh, holding the snail securely until it ceases to struggle. The snake begins extracting snail flesh only when all snail movement has ended, which may take upwards of an hour or more for *Drymaeus* species. The hesitation to eat the snail immediately is thought to be a direct response to the effectiveness of the snake's saliva. Actual feeding and extraction of the gastropod's meat takes around five minutes or less and 80 to 90% of the snail flesh is usually retrieved by the snake. The shell remains intact and largely undamaged.





For other species of land snails, such as the larger Mayan Marauder [ed. note: *Euglandina ghiesbreghti* (Pfeiffer, 1856)], *S. nebulata* execute the usual strikes (as seen in other snake species), grabbing, yet sometimes missing, whatever portions of the snail remain outside the shell. Upon securing the snail's body, the snake holds its prey without moving, up to 24 hours or more until the snail ceases to struggle at which time it is then consumed. Slugs eaten by *S. nebulata* are seized promptly and eaten without the hesitation seen with shelled species, whole feeding events usually lasting only a few minutes.

Perhaps species equipped with operculum structures (snail doors) act as a deterrent to the snakes, preventing the snake's lower jaw from entering the aperture of the shell. This however remains to be investigated. Non-mollusk organisms offered to the snakes included frogs, lizards, small snakes, earthworms, beetle larva and other invertebrates, all of which were declined. All foods presented were found locally and native to the Maya Mountains with the exception of *Veronicella floridana* (a native slug to Florida, USA, and Cuba).

These feeding behaviors suggest that *S. nebulata* is able to distinguish shelled and non-shelled gastropods (slugs) and is able to differentiate shelled snail species based on size and aperture shapes, perhaps through visual or olfactory senses. Clearly, *S. nebulata* uses different feeding strategies for dissimilar snail species. Further, these sequences of events strongly suggest that the snakes use immobilizing saliva to relax or even kill shelled snails before consumption. This is thought to make extraction of the muscular and slippery snail flesh easier to take. Another interesting fact: Sibons are reported to have a greater number of teeth in their lower right jaw than their lower left jaw, an evolutionary response to land snails in this region having right-sided apertures (openings). This allows the snake to reach deeper into the shell, resulting in removal of a higher percentage of snail flesh.

These evolutionary marvels are just a small taste of the fantastic biodiversity of the Maya Mountains of Belize. So next time you dine on the delicacy of escargot, know that you are part of an elite group of "snail-suckers" like the *Sibon nebulata*!

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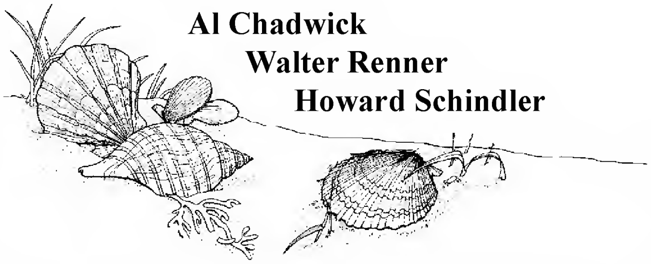


Al Chadwick
Walter Renner
Howard Schindler

Are snails slowing down?

Tom Eichhorst

We all know that few mollusks are going to set any speed records. According to the BBC (yes, things are a bit tarnished around the edges over there, but they still get their science correct most of the time) a couple of researchers in Chile, have found that some snails may in fact be slowing down. Disclaimer - we are talking metabolism not speed, though they think speed might also be involved.

Robert Nespolo and Paulina Artacho of the Southern University of Chile, in Valdivia, have been watching and measuring about 100 garden snails (*Cornu aspersum* (Müller, 1774), or *Helix aspersa* as it is still often termed) in an attempt to test the "energetic definition of fitness" hypothesis. The EDF holds that animals that expend less energy for day-to-day maintenance will have an evolutionary edge as they have excess energy for growth and reproduction, and thus an edge in the survival game. To test this the team determined the metabolism of the snails by measuring how much carbon dioxide each snail produced while at rest. The snails were kept in garden containers so they were readily accessible. After seven months they collected the snails (including the dead empty shells). They found that shell size had no correlation with measured metabolic rate, but longevity did. The snails still alive after the seven month period were typically those that had been initially measured as having a 20% lower metabolic rate. It seems that a lower metabolic rate meant a greater chance for survival.

Previous attempts to study the EDF hypothesis involved wild mice. These studies failed as it proved rather difficult to recapture all of the mice after an extended period and it could not be determined if the missing mice had died or simply left the area. Robert Nespolo and Paulina Artacho kept their snails in a confined area and they could thus account for all of the study snails as the dead snails left behind their shells. The team now want to see if the slower metabolic rate correlates with a slower snail crawling speed. Anyone who has read any of the many works by Geerat Vermeij will immediately spot the absence of a key evolutionary force in this study - the predator-prey relationship. It could be that the wild mice that could not be recaptured were the slower group and were all eaten. Let's put a box turtle in that snail container and see what happens to the slower snails.

bbc.co.uk/go/pr/fr/-/earth_news/newsid_8043000/8043689.stm
5/11/2009

A re-description of the du Pont Trophy (Shell Show Award: Outstanding Exhibit) with notes on distribution and morphology

Elizabeth K. Shea and Leslie L. Skibinski
Department of Mollusks, Delaware Museum of Natural History, Wilmington, DE 19807

Introduction: The du Pont Trophy for the overall outstanding exhibit at a shell show has been awarded by the Delaware Museum of Natural History (DMNH) since 1969, the year Dr. R. Tucker Abbott left the Academy of Natural Sciences of Philadelphia (ANSP) to become the founding Curator of Mollusks at DMNH. One of Tucker's enduring legacies is his reputation as a bridge between the amateur and professional communities. In keeping with that legacy, the du Pont Trophy celebrates the important contributions that amateur naturalists make in popularizing and advancing the study of mollusks.

Over the last 42 years, the du Pont Trophy has been presented more than 600 times at over 40 different shell shows in 14 different states. Prior to 1991, the trophy was occasionally awarded overseas (Table 1), but its distribution has become more restricted over time (Fig 1). In the last 10 years, the trophy has been awarded primarily in Florida, although robust shell clubs and shell shows remain in the mid-Atlantic and the Pacific Northwest.

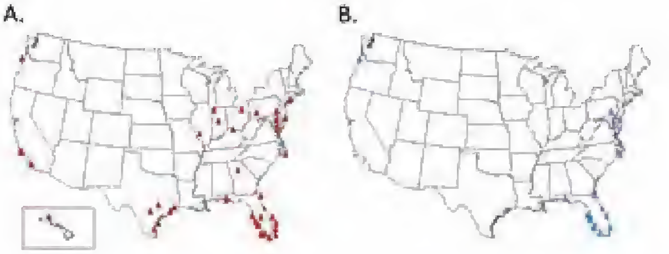


Fig. 1. The distribution of the du Pont trophy has changed over the last 40 years. A) Red triangles mark the location of all American shell shows that have awarded the trophy. B) Blue triangles mark the shell shows offering the trophy in 2010-2011.

History of the du Pont Trophy: The du Pont Trophy originated at ANSP as the "Academy Award" (Fig 2a), but when Tucker moved to DMNH in July of 1969, the award moved with him. In September 1969, Tucker sent a letter to the amateur shelling community via the shell shows announcing the beginning of the du Pont Trophy and the retirement of the Academy Award (Fig. 3). Although the name of the award changed to acknowledge museum founder John E. du Pont, the intent of the trophy has never changed.

The first du Pont Trophy was a statue similar in size to the Academy Award, but inserted on a cup rather than a column. Our research shows that the first du Pont Trophy was awarded to Mrs. Faye B. Howard for her exhibit, "Symbiosis" at the first Santa Barbara Shell Show, October 10-12, 1969 (Fig 2b). The statue form of the trophy was relatively short-lived, awarded at just 28 shows over a two year period from 1970 - 1971.

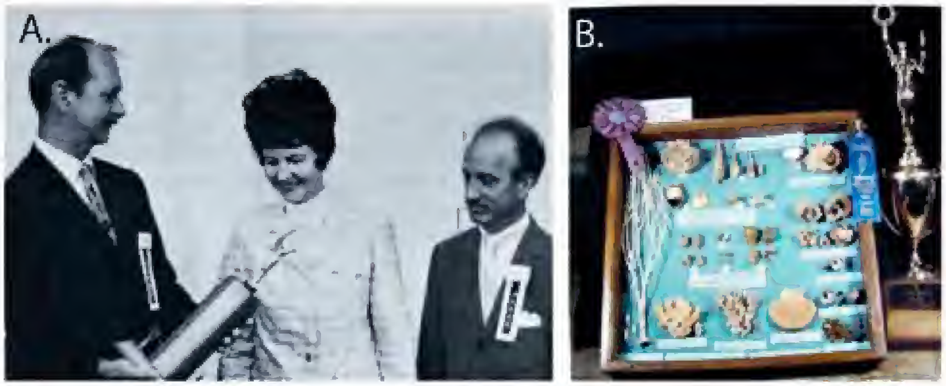
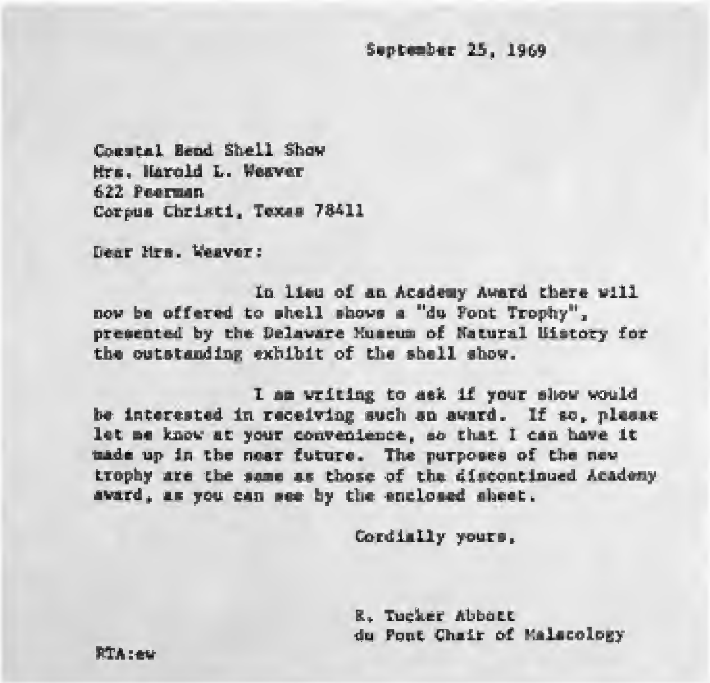


Fig. 2. The transition from the Academy Award to the du Pont Award. A) Mrs. J.R. Black was the 1969 winner of the Academy Award at the Sanibel Shell Fair. The text accompanying the photograph reads in part, "Dr. Donald R. Moore and Dr. Vincent Conde present the trophy from the Academy of Natural Sciences of Philadelphia to Mrs. J.R. Black of Fort Myers, for the outstanding exhibit of the Show." Photos used with permission of the Sanibel Shell Club. B) The 1969 Santa Barbara Shell Club winning entry "Symbiosis" by Mrs. Faye B. Howard. Photos used with permission, Santa Barbara Museum of Natural History, Archives.

In 1972, the year the museum opened to the public, the trophy was changed from a statue to a walnut plaque, with a slice of polished "*Turritella* agate" on top and a metal plate engraved with the year and name of the shell show on the bottom (Fig. 4a). The stone came from fossilized freshwater lake deposits in the Green River Formation (53-42 million years ago). The freshwater snails seen in cross section are *Elimia tenera* in the family Pleuroceridae, suggesting the name "*Turretella* agate" is a bit of a misnomer.

In 1982, the trophy was re-designed again in conjunction with the 10th anniversary of the museum opening. Collections staff, especially Russell Jensen, worked with the Brey Studio Lotus Tile Company in Pennsylvania, to custom-design a porcelain bas-relief *Nautilus* on green Jasperware. The 4" x 5" tiles were used in place of the *Elimia* agate, but the engraved plate with the shell show name and year was retained (Fig 4c). This "Wedgewood" trophy



September 25, 1969

Coastal Bend Shell Show
Mrs. Harold L. Weaver
622 Peerman
Corpus Christi, Texas 78411

Dear Mrs. Weaver:

In lieu of an Academy Award there will now be offered to shell shows a "du Pont Trophy", presented by the Delaware Museum of Natural History for the outstanding exhibit of the shell show.

I am writing to ask if your show would be interested in receiving such an award. If so, please let me know at your convenience, so that I can have it made up in the near future. The purposes of the new trophy are the same as those of the discontinued Academy award, as you can see by the enclosed sheet.

Cordially yours,

R. Tucker Abbott
du Pont Chair of Malacology

RTA:ew

Fig. 3. Example of a letter sent by R. Tucker Abbott signaling the change from the Academy Award to the du Pont Trophy.

debuted in 1983.

Why the trophy changed from a fossil snail to a cephalopod is not documented, but it is likely a reflection of the large amount of *Nautilus*-based research underway at the museum during this time period. Starting in October 1974, Museum Trustee Horace "Dug" Dugdale founded and was the editor of the *Chambered Nautilus Newsletter*. This newsletter provided a venue for *Nautilus* researchers to connect and communicate (e.g., announcing the first observations of *Nautilus* embryos in 1985). Since 1982, the image of a *Nautilus* in cross-section has been associated with the trophy, and for a long time it was the unofficial emblem of the museum.

When the Jasperware supply ran out in 1990, the plaque was simplified to a single etched brass plate with a cross section of a *Nautilus* on top and the year and shell show on the bottom. (Fig. 4c). This simple but elegant dark walnut plaque has been the standard for the last 20 years.

The 2012 du Pont Trophy: In 2012, the trophy was re-imagined and updated to mark the 40th Anniversary of the opening of the museum, bringing us back to the original intent of updating the trophy regularly. After careful consideration, we decided the new design had to:

- develop a stronger link between the trophy and the museum's mollusk collection,
- appeal to shell lovers by focusing on the beauty of shells,
- appeal to collectors by incorporating a new design each year, and
- maintain the feel of an award.

The new trophy is a signed, limited-edition print of a commissioned watercolor based on a shell from the mollusk collection (Fig. 5). The shell show name and year of the award are engraved onto brass coated plates attached to the frame. On the back of each award is a short description of the shell, the DMNH catalog number, and background information on the artist.

The 2012 du Pont Trophy celebrates the scholarship of the early days of the museum's Collection and Research Division, and recognizes the museum founder and trophy namesake by selecting the volute *Festilyria duponti* Weaver, 1966 (Holotype, DMNH 13706). The shell rests on a copy of the book, "*Living Volutes: A Monograph of the Recent Volutidae of the World*" written by Clifton S. Weaver and John E. du Pont and published by the museum.

Philadelphia artist Lauren Sweeney, Ph.D. worked with collections staff on the shell and book composition, and painted the watercolor. Lauren received a Ph.D. in anatomy and cell biology from the University of Nebraska. After a career in research and teaching, she transitioned to a life as a full-time artist in the early 2000s and has been finding inspiration at the museum since 2006.

Moving forward: We will select a new shell, or group of shells, from the museum's mollusk collection to highlight for the trophy artwork. The twelve to thirteen trophies awarded each year will be limited edition, signed prints. The original watercolors, however, will be donated to the museum with the expectation that they will be sold or auctioned to raise money for the Collections and Research Division.

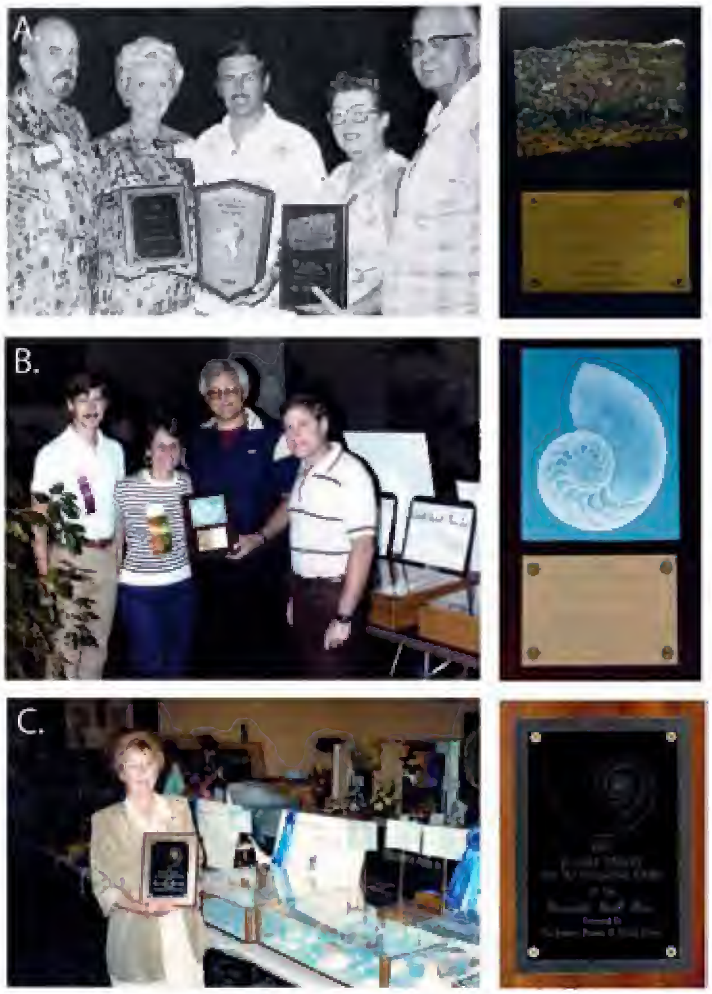
As part of the redesign process, we asked shell show award chairs, participants and winners to provide feedback on the trophy redesign. Reviews thus far have been mixed, with many thoughtful comments received. Overall, the trend suggests that exhibitors appreciate the new style, but would like it to feel more like an award. We will do our best to incorporate these suggestions as we move forward.

Please feel free to send any additional suggestions or comments to either Leslie Skibinski (lskibinski@delmnh.org) or Liz Shea, Ph.D. (eshea@delmnh.org). We are especially interested in updates and corrections to our records regarding dates, shell club mergers or name changes, and winner names and exhibit titles.

Acknowledgments: Many thanks to collections volunteers Karen O'Donnell and Sarah Lewis, who helped us pull together and organize all the archival material about the du Pont Trophy, and to Meredith Hatzinikola and Rosemary Ginzberg, who took pictures of the trophies. We thank Gary Rosenberg, Ph.D. of the Academy of Natural Sciences for donating a Jasperware trophy to the DMNH archives thus completing our set. Thanks to all the shell show organizers and especially the awards chairs for their thoughtful input as we have moved through this process. Parts of this article were presented as a poster at the 2012 American Malacological Society meeting in Philadelphia, PA.

Table 1. (page 24) A complete listing of the du Pont Award presentations.

Fig. 4. (right) Awardees (left) and a close up of the changing du Pont Trophy (right) between 1971 and 2011. A) "*Turritella* agate" version of the trophy was awarded to Minnie Lee Campbell and Don Campbell (right) in 1980 at the Jacksonville Shell Club, Inc. Photo used with permission of the Jacksonville Shell Club. B) John and Mary Flentz win the Wedgewood plaque version at the West Coast Shell Show in 1984 for their exhibit, "The spell of the shell on stamps." Photo used with permission of the Santa Barbara Museum of Natural History, Archives. C) Virginia Geyer wins the etched plaque version at the Marco Island Shell Club in 1991 for her exhibit, "Seashells – Birth to Maturity." Photo used with permission of the Marco Island Shell Club.



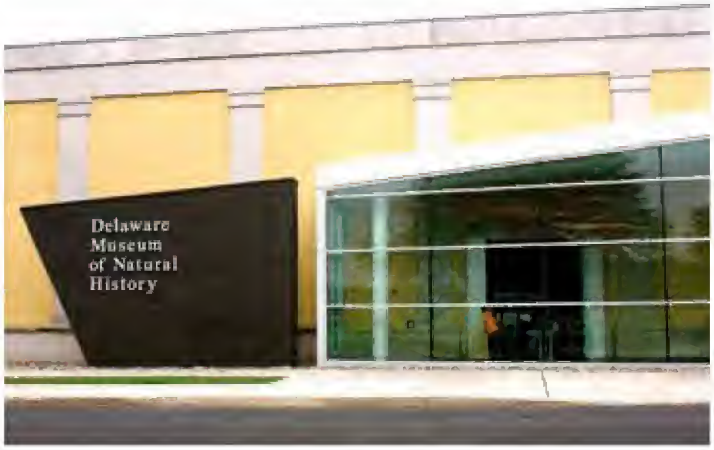
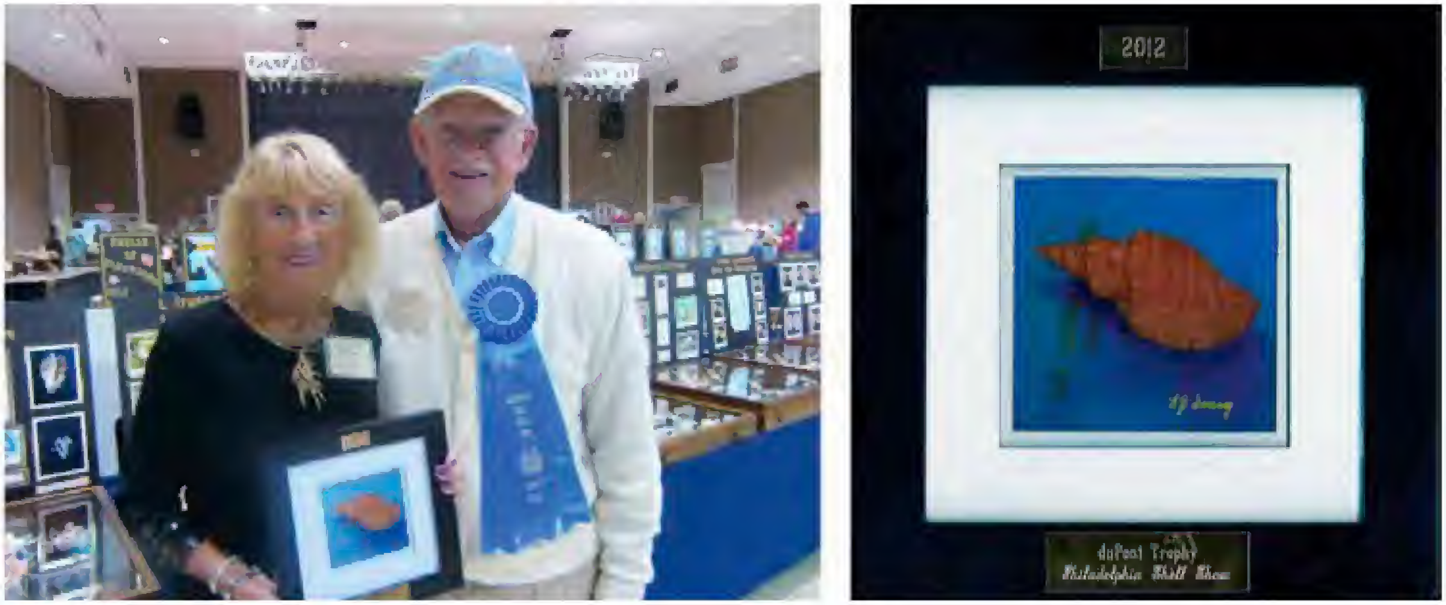


Fig. 5. (above) "The Delaware Museum of Natural History opened to the public in 1972 to excite and inform people about the natural world through exploration and discovery. As the only natural history museum in the state, the Museum welcomes more than 75,000 visitors each year to experience an African watering hole, gaze up at a giant squid, encounter a jaguar face-to-face, and marvel at the diversity of shells from around the globe. Gallery highlights also include the only permanent dinosaur collection in Delaware, a simulated coral reef, and a Science in Action paleontology lab." (quoted from www.delmnh.org/about.php)

Fig. 6. (below) The 2012 du Pont Trophy redesign was conceived by Museum staff and painted by artist Lauren Sweeney (www.inliquid.com; ljsweeney1@verizon.net). The first winners of the redesigned trophy were Pat and Bob Linn of the Astronaut Trail Shell Show for their exhibit, "Those Amazing Conchs-*Lambis*" (left). A close up of the new du Pont Trophy (right) shows the volute (*Festilyria duponti*) on the classic volute book.



Shell Club	**Associated Shell Show**	**Location**	**Years Trophy Awarded**	**No.**
(National)				
Astronaut Trail	Astronaut Trail[a]	Melbourne/Merritt Is, FL	1979-1983, 1985-1990, 1992-2012	31
Broward County	Broward	Fort Lauderdale/Pompano Beach, FL	1977, 1998-2012	14
Central Florida	Central Florida	Orlando, FL	1970-1973, 1977-1983, 1985-2004	32
Cincinnati	Tri-State	Cincinnati, OH	1980, 1982, 1984	3
Cleveland	Cleveland	Cleveland, OH	1975-1980, 1982	7
Coastal Bend	Coastal Bend[b]	Corpus Christi, TX	1970, 1972-1974, 1976, 1982	5
Crown Point Shell Collector's Study Group	Crown Point	Crown Point, IN	1983, 1985, 1987, 1989	4
Fort Myers	Fort Myers[c]	Fort Myers, FL	1970-1980	12
Galveston	Galveston	Galveston, TX	1972	1
Georgia	Georgia		1980-1994	15
Greater Miami	Greater Miami[d]		1978-2001	24
Greater St. Louis	Greater St. Louis[e]	St. Louis, IL	1970, 1972, 1974, 1976, 1978, 1980, 1984, 1986, 1988, 1990, 1991, 1992, 1994, 1996, 1998	16
Gulf Coast	Gulf Coast[f]	Texas	1970, 1983-1985, 1987-1992, 1994-1996, 2003, 2011	15
Hawaiian Malacological Society	Hawaiian	Honolulu, HI	1971-1973, 75, 77, 79, 1981-1982, 1988	9
Indianapolis	Midwest Regional	Indianapolis, IN	1978-1984, 1986, 1988, 1990	10
Jacksonville	Jacksonville	Jacksonville, FL	1972-1973, 1975-1991, 1993-2010	37
Jersey Cape	Jersey Cape	Stone Harbor, NJ	1988, 1995-2011	17
Long Island	Long Island	Flushing/Baldwin, NY	1982, 1984, 1987-1988, 1990	5
Marco Island	Marco Island	Marco Island, FL	1983-2012	29
Naples	Naples	Naples, FL	1970-1998, 2000-2004	35
North Carolina	North Carolina	Mayodon/Morehead City, NC	1974, 76, 79, 1981-1982, 1984-2011	33
Oregon Shell Club/Oregon Soc. of Conchologists	Oregon Society of Conchologists[g]	Portland, OR	1970-1993, 1995-1997, 1999-2008, 2011-2012	40
Pacific	Pacific	Downey, CA	1994-1997	4
Palm Beach County	Palm Beach County	Florida	1970-1971, 1976-1987, 1991, 2000	16
Philadelphia	Philadelphia	Philadelphia, PA	1993-2011	18
Pittsburgh	Pittsburgh	Pittsburgh, PA	1972-1977	6
Port Isabel/South Padre Island	South Padre Island	Port Isabel, TX	1970	1
San Antonio	San Antonio Shell Expo.	San Antonio, TX	1970	1
San Marcos	San Marcos	San Marcos, TX	1973, 1975	2
Sanibel-Captiva	Sanibel Shell Fair / Show	Sanibel Island, FL	1970-2012	43
Sarasota	Sarasota	Sarasota, FL	1970-2006, 2009-2012	41
Sea Shell Searchers of Brazoria County	Sea Shell Searchers	Lake Jackson, TX	1970, 1971, 2000-2010	13
Santa Barbara Malacological Society	West Coast	Santa Barbara, CA	1970-1972, 1974, 1980-1985	11
South Florida	South Florida[h]	Miami, FL	1970-1978	9
Southwest Florida Conchologist Society	Southwest Florida[i]	Fort Myers, FL	1971-1989, 1992-1997	25
St. Petersburg	St. Petersburg	St. Petersburg, FL	2009-2012	3
Tidewater Shell and Fossil Club	Tidewater Shell Exhibit	Tidewater, VA	1971, 1972	2
Treasure Coast	Treasure Coast	Palm City, FL	1988-1996, 2004-2006	12
(International)				
British Shell Collectors Club	British Shell Show	London, England	1977	1
Salon Internationale du Coquillage	International Shell Show of Lausanne	Switzerland	1988, 1989, 1991	3

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a Trophy may have been awarded in 1977

b Coastal Bend and Bay City may be the same show in 1973; 1982 Texas State Shell Show put on by Costal Bend Shell Club

c South West Florida merged with this club in 1981

d South Florida Shell Club 1972-1976

e Metropolitan Sea Shell Show in 1980 & 1982

f This may be 2 different shows; earliest is in Texas, 2nd may be Florida; 1989 FL show claims it is holding its 9th show

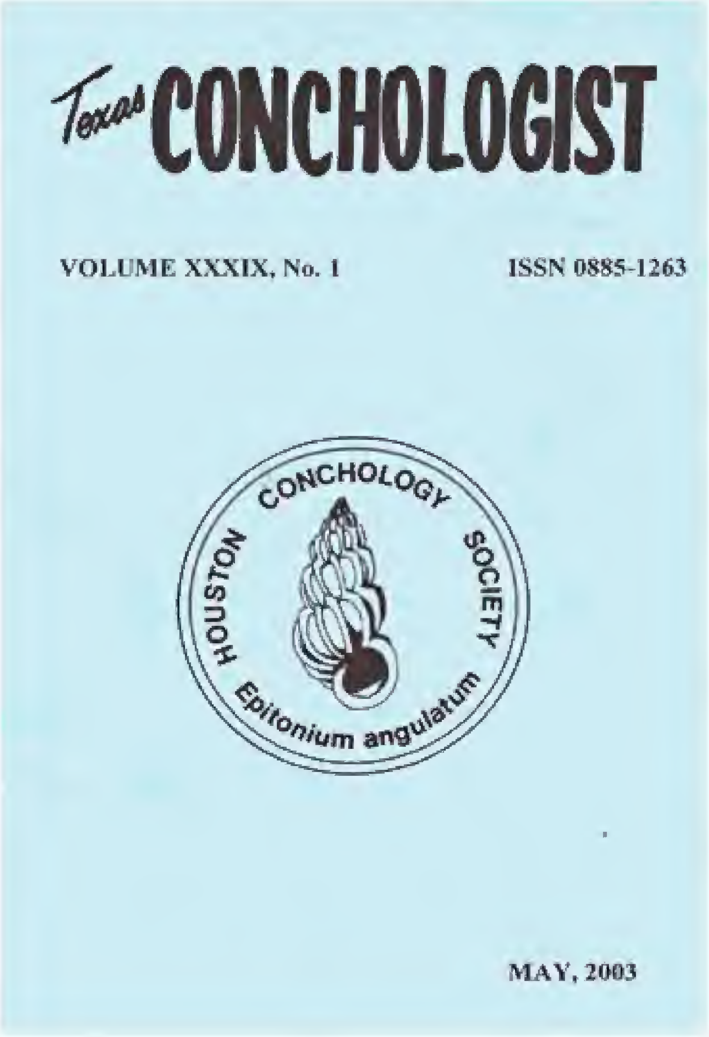
g Changed name in 1972

h Renamed Greater Miami Shell Club in 1977

i Merged with Fort Myers Shell Club in 1981

The *Texas Conchologist*

Lucy Clampit


Texas CONCHOLOGIST

VOLUME XXXIX, No. 1 ISSN 0885-1263

HOUSTON CONCHOLOGY SOCIETY
Epitonium angulatum

MAY, 2003

The Houston Conchology Society is pleased to announce that its scientific publication, the *Texas Conchologist,* is in the process of being posted online at the Biodiversity Heritage Library website. The direct link to the TC is: http://www.biodiversitylibrary.org/bibliography/50836. At this time, volumes 1-3 are in the process of being scanned and posted. The posted volumes are not in numerical order, but will be in order when the posting is finished.

This article is written to acquaint readers with the history and the scientific importance of the publication. In Vol. 25, No. 1, Editor Constance "Connie" Boone celebrated the 25th anniversary of the TC with an article about its history, which this writer used as a guide. Through the years, the TC had many editors, but Connie held the position the longest. For her, the publication was a labor of love.

When the TC began publication in September of 1964, it had no name and the HCS was known as the Conchology Group of the Houston Outdoor Nature Club. The society's goal was to publish 10 issues a year on a monthly basis (August-May). In the December 1964 issue, the name became the *Texas Conchologist*. The number of issues per year was changed to nine. Money was scarce, so some issues were combined. Beginning with volume 9, the TC became a quarterly publication. It eventually became 1, 2, or 3 issues a year until its demise after volume 39 in 2003.

The TC contains articles by numerous professional and amateur malacologists and conchologists from Texas and around the world. All contributors were held to the same high standards and if one did not use Latin names for the mollusks, the article was not printed. A few of the many contributors were: T.E. Pulley, Dr. W.W. Sutow, Raymond W. Neck, Harold W. Harry, Roger T. Hanlon, Emilio Garcia, Paula M. Mikkelsen, Dr. Harry G. Lee, Helmer Odé, Henk K. Mienis, Connie Boone, and Joseph P.E. Morrison. The articles cover a wide variety of topics, including reports on collecting trips around the world, biographical information about Texas malacologists, shells on stamps, etc., but most are about Texas shells – marine, land, freshwater, and fossils.

In 1969 the Houston Museum of Natural Science teamed up with the US government to use divers and destroyers to collect mollusks for a population study of the Northwestern Gulf of Mexico. Helmer Odé helped to direct the operation. He spent many years studying and writing about the material collected. His monograph "Distribution and Records of the Marine Mollusca in the Northwest Gulf of Mexico" began in Vol. 11, No. 1, and became the core of the TC.

Helmer was invaluable to the TC. He served as editor for several years and compiled an Index for volumes 1-10 that was published in Vol. 10, No. 9, beginning on page 92. An index to Helmer's "Bivalvia" was published in Vol. 18, No. 4. Helmer also studied worldwide Pyramidellidae, especially the genus *Turbonilla*. TC Vol. 32, No. 1, contains some of his work on northwest Gulf of Mexico material. Numbers 2 and 3 of volume 32 are "A List of *Turbonillid* Taxa for the Western Atlantic." Volumes 33-35 have lists of *Turbonillids* from the west coast of the Americas, the Indo-Pacific, the Mediterranean, and the west coasts of Europe and Africa.

Since the TC is a valuable resource about Gulf of Mexico and Texas shells, members of the Houston Conchology Society are happy to make it available for everyone to use. We thank Pat LaFollette for helping and encouraging us in this endeavor.

Lucy Clampit
lclampit@
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An analysis of the microsnails from six habitats in the "Kochi Hill" area, Bernheim Arboretum and Research Forest, Bullitt County, Kentucky

Harry G. Lee and Lori Schroeder

Abstract - Now in its third year, a land snail biodiversity study is being conducted in the Bernheim Arboretum and Research Forest (BARF), headquartered in Clermont, Bullitt County, Kentucky, but covering some 14,000 acres in Bullitt and Nelson Counties. This report focuses on a special collecting campaign within the study. It was designed to document abundance and diversity of microsnails (adult shells 5.5 mm or less) at a single location, "Kochi Hill," in the Bullitt Co. portion of BARF. We employed a strategy of studying duff samples taken from distinctly differing microhabitats within this small area, previously found to be unusually productive in numbers and diversity of mostly larger snail species. The results revealed the site to be a "biological hotspot" in terms of microsnail abundance (951 specimens identifiable to the species level) and diversity (31 species). Ecological implications of the qualitative and quantitative attributes of the data are discussed.

Key words: Bernheim; Bullitt County; biodiversity; ecology; Kentucky; land snails.

Introduction - Located in the Knobs region of Kentucky, "Kochi Hill" is a feature within the Bernheim Arboretum and Research Forest (BARF) on Harrison Fork Road in Bullitt County. The location was thus informally named after extraordinary numbers (44 total) of dead *Anguispira kochi* (L. Pfeiffer, 1846), Banded Tigersnail, were found strewn about the hillside at the time of initial reconnoiter (7 June, 2009). Considering the abundance and biodiversity of land snails and their remains [18 species] found at that time, we determined a systematic re-collection of the site was advisable. This decision was based on three considerations: (a) since only visual reconnaissance was employed, microsnails were nearly excluded from the initial inventory (only two species found), (b) previous work had demonstrated a distinct synergy between duff sampling and microscopic examination, and visual reconnaissance techniques in detecting biodiversity (Lee, 1990, 1993, 2008a, 2008b), and (c) differing microhabitats occur on and in the immediate vicinity of the hill. Consequently a strategy was employed to liberally sample and analyze duff from a variety of ecologically distinctive sites in the area in expectation of a much augmented biodiversity inventory and to allow analysis of possible microhabitat-microsnail species interplay.

Materials and Methods - Perched atop the southern end of a low ridge between Overalls and Wilson Creeks, "Kochi Hill" rises rather abruptly some 30 m and is capped by scarps of moss-laden limestone. Beginning at the base of the scarps a mature hardwood forest rapidly becomes dominant. The area included in the study was limited to an area somewhat less than an acre (see Appendix: Map). Due to heavy foliage during the summer months, fall was chosen as the optimal time for sampling.

All samples were collected by the junior author and Jeff Schroeder on 25 November, 2011. Six one gallon Ziploc™ bags were labeled and each filled with ample material from one of the following loci on and immediately adjacent to "Kochi Hill: (1) a limestone escarpment high on the slope, (2) a tree crotch downhill, (3) soil (paucity of leaves), (4) leaf litter roughly 2 m distant from the soil sample, (5) under decayed hardwood deadfall, and (6) a low grassy tract along Wilson Creek, a portion of which was particulate alluvial material (wrack). For further elaboration see Appendix: Images 1-5.

Samples were processed by the junior author using a slight modification of the technique of Lee (1990, 1993): (1) drying of each sample in an oven set to 180° for 24 hours, (2) cooling for one or more hours at room temperature, (3) and sifting through a (2.2 mm square porosity) kitchen strainer to remove large objects such as rocks, stems, leaves, and nut hulls followed by a second sifting through a finer sieve (1.3 mm square porosity). It should be noted that, although an attempt was made to sample roughly equal volumes of material at the six sites, after the exclusion of material not clearing the 2.2 mm square sieve, apparently due in large part to the physical composition of the sample material, the remaining volumes differed somewhat: sample 1: 700 mL; 2: 925 mL; 3: 550 mL; 4: 700 mL; 5: 500 mL; 6: 900 mL.

With the use of a stereomicroscope at 10-20X, shells and shell fragments of microsnails from each of the three subsamples (retained on sieve 1, retained on sieve 2, and that which passed through both) were segregated into no. 3 gelatin capsules. Two-dram clear glass vials were utilized for protection of the capsules thereafter. The relative homogeneity within each subsample improved the ease and efficiency of this culling process.

Subsequently the senior author reviewed the cullings by species using similar microscopy. Material too fragmented or otherwise degraded for species-level identification was discarded at this point. Identification was made by reference to a number of works (notably Pilsbry, 1940, 1946, 1948, and Dourson, 2011) as well to material in the Lee collection. All specimen lots are vouchered in the Lee collection.

Results - A total of 951 microsnails of thirty-one species in 111 lots was identified. The great majority were empty (dead) shells. Table 1 indicates the species identified; the number of specimens for each species appears in parentheses. Overall microsnail abundance varied widely, with species being represented by 1 to 199 specimens. Figure 1 illustrates this species distribution graphically. Figure 2 shows the occurrence of individuals by sample site. Figure 3 shows distribution of species by sample.

Despite nearly equivolumetric sample sizes, disparate specimen richness (33 to 394) at each site can be seen in Table 2 and is graphically depicted in Figures 3 and 4. Much less variable was the species richness by site (14-22), which is also indicated in Table 2 and graphically represented in Figures 3, 4, and perhaps best in Figure 5, where it is expressed as **percentage** of the sample.

Discussion - This dedicated search for microsnails produced prodigious numbers of specimens (951) and species (31); see Table 1. Corollary to this discovery is its complementarity with more traditional collecting methods, which target larger snail species. As anticipated, this combination of strategies greatly enhanced the scope of overall land snail biodiversity sampled at "Kochi Hill." Appendix Table 3 combines these 31 microsnail species with 22 others, only one of which is a microsnail, taken principally by visual surveillance. The product is a total of 53 species of land snails collected here from 7 June, 2009 to 25 November, 2011.

Another noteworthy attribute of the data is the relatively uniform level of species richness across the six sampling sites (14-22 species per sample) despite the wide variation in specimen abundance (33-394); see Table 2. Corollary to this finding, and evidenced in Table 2 and Figures 3, 4, and 5, is the surprising frequency of any single species across samples. The average number of stations per species was 3.3 of the six stations, and only seven species were unique to a single station. Interestingly, of the seven, all but two records reflect a single specimen, the exceptions being two shells of *Lucilla* cf. *L. nummus* and five of *Gastrocopta tappaniana* (both species in sample 6).

What difference does microhabitat make? While it certainly seems to influence the richness of microsnail abundance, its effect on species composition is far from obvious. The following analysis attempts to formulate an answer to the latter question, which is central to the design of this study, and which Table 2 and Figures 1-4 are intended to help clarify.

Sample 1.

The expected salutary effect of surface calcium carbonate manifest at sample site 1, limestone escarpment, seems confirmed in this study, with nearly half the microsnail specimens found at this one site. Yet, if one were to remove the 157 specimens of *Carychium exile* from consideration, the differences would be far less evident and a statistical analysis would likely refute this correlation – at least with consideration of sites 2 and 3.

Of the 21 species found in sample 1, only one, *Gastrocopta corticaria*, represented by a single specimen, was unique to the sample. Ecologically, *G. corticaria* has been associated with the bark of hardwood trees since its original description (the species epithet means "of bark"), and although it seldom occurs in great numbers, it has not previously been associated with limestone-rich habitats. The likelihood of its unique occurrence at site 1 may be considered as a stochastic (random) event. On the other hand, the finding of 77% of the specimens of *Hawaiia alachuana* in sample 1 not unlikely reflects the favorable influence of a calcium-rich microhabitat on this species, which was recognized as a calcphile by Hubricht (1985: 29).

The remainder of the species at site 1 (19) were shared with an average of 3.5 of the other five stations. Thus it is difficult to tease out any species that is strongly dependent on abundant calcium, an obligate calciphile

On the other hand, the absence of *Zonitoides arboreus*, which occurred, albeit in relatively small numbers, at all of the other five sample sites, two of which had relatively few microsnails, may well indicate this species's affinity for trees or wood (*arboreus* means "of trees") and/or disaffection for abundant calcium, a recognized attribute of calcifuge snails.

Sample 2.

The 18 species found at site 2, the tree crotch, were shared with an average of nearly four of the other five stations, and none of the sample 2 species was unique to the site. Examination of Table 2 fails to reveal evidence of any clustering by specimen count of species in this sample.

Sample 3.

Of the 20 species found in the sample taken at site 3 (soil sample with a paucity of leaf litter), none was unique and each was shared with an average of 3.75 other site samples. Table 2 fails to reveal evidence of any clustering of species by specimen count in this sample.

Sample 4.

This sample (leaf litter) contained 22 species, the highest species richness of all six sites. Two snails, *Punctum blandianum* and *Glyphyalinia lewisiana*, were unique to this sample, and each was represented by only a single specimen. Of the remaining 20 species, each was found in an average of 3.5 other samples. Further, a comparison with sample 3, taken 2 m away in a leaf-poor microhabitat, shows a high concordance in species composition (18 in common). Two species were present in sample 3 not 4 and four in sample 4 not 3, but, of these six species, all but one, *Carychium exiguum* (two individuals in sample 4), was represented by only a solitary specimen . Examination of Table 2 fails to reveal evidence of any clustering of species by specimen count in this sample.

Sample 5.

The number of specimens found at this site (under hardwood deadfall) was relatively quite low, but the relative species richness was high (33 shells of 14 species). No species was unique to this sample, and each was found in an average of 4.2 other samples. A single quantitative anomaly, a disproportionate contribution by the uncommon microsnail, *Zonitoides limatulus*, is noteworthy.

Sample 6.

The sample of grass and wrack near Wilson Creek had the most atypical composition of all six sites. Comprised of only 50 specimens, it had a relatively high species richness (16), and most notably, contained four species not found at any other sampling site. Only three species in all the other 901 specimens distributed over five samples were thus unique. The sample 6-only species (no. specimens): *Pupoides albilabris* (1), *Vallonia costata* (1), *Lucilla* cf. *L. nummus* (2), and *Catinella* species (1), although rare, were unique to this site. Another species, *Gastrocopta tappaniana* (5), was represented by only one specimen in the remaining 901 shells. Each of these five species is recognized as preferring at least two of the attributes of this site: low, moist, relatively open, grassy, and disturbed (Hubricht, 1985).

In order to determine if there are actual ecological forces driving the distribution of the species whose shells were found during this survey, one must address two overarching considerations: (1) Is it correct to presume the shells found accurately represent the species that actually lived at the respective sites? Two principal factors bear on the legitimacy of this assumption: (a) Taphonomy: movement of the shells over space and time. Transport of shells by water drainage, wind, foraging animals, etc., can certainly rearrange a natural thanatacenosis (snail mortuary) in a confusing manner. (b) Persistence of the shells under natural conditions: how long has the average specimen been around? (2) To what extent do random (stochastic) forces shape the composition of our samples?

Admittedly a bit hazardous, in the interest of expedience, we have accepted assumption (1) above for samples 1-5. Although the possible taphonomic forces of downhill displacement of shells may well have contributed to this homogeneity, on consideration of the **remarkable similarities in species composition** of these five samples, along with the **rarity of exceptional species occurrences**, the findings appear best explained by stochastic factors. The relatively few exceptions specifically cited above might be put to the test at a later date using different protocols, but it appears that ecological partitioning among these five samples (sites) played only a minor role in their species composition.

In interpreting the Station 6 fauna we must, however, confront the taphonomic issue of the constantly running water of nearby Wilson Creek and the consequent delivery of shells from upstream origins to the sample site, especially the (unsegregated) wrack moiety, producing a biased sample. While there is no certainty that the shells of some of the four unique Station 6 species and *Gastrocopta tappaniana* naturally occurred there, it seems reasonable to consider that the case for at least the latter, based on the species' well-documented preference for wet places including stream margins (*e.g.*, Hubricht, 1985: 9). As noted above, the five species are adapted to ecological conditions prevailing at the sample site and not characteristic of the other five sites.

It must be remembered that the study was driven by a quest for a more thorough biodiversity inventory. Limited ecological implications notwithstanding, the gathering of multiple samples and specifically the inclusion of grass and wrack along Wilson Creek (Station 6) certainly accomplished that aim. The contribution of the latter sample to overall diversity distinctly exceeded that expected from the habitat distinctions upon which the Stations 1 through 5 were based.

It is anticipated that a more focused sampling of the Wilson Creek bank, floodplain, and immediately adjacent uplands with limited tree cover but less moisture may provide further insight into land snail ecology in this relatively scarce habitat in BARF.

Another consideration would be to test assumption (1) above and somehow determine the presence of snails actually living at each of these substations. In order to empower such a study with robust sample sizes, a more selective and efficient collecting strategy would probably be necessary, e.g., snail trapping; see Lee (2002).

In retrospect the peninsular shape of "Kochi Hill," with two very long sides exposed to the elements, might not have been a landscape particularly hospitable to land snails and their collecting. The southern terminus, the area of the most focus of this report, is very near a road, albeit lightly traveled, which exhibits ample evidence of human impact some distance from its swath. The steepness of the terrain poses a challenge to collecting since gaining solid footing is not easy. These apparent detractions notwithstanding, the thriving land snail populations discovered in this somewhat disturbed yet reasonably accessible location has proven of significant interest and lends itself well to continued study.

Conclusions - A systematic sampling of the microsnails of a small area on and immediately adjacent to "Kochi Hill," BARF, Bullitt Co., KY succeeded in greatly augmenting the assessment of land snail biodiversity at the location. Despite strategic sampling of discrete microhabitats to test ecological interactions with the faunal composition, the microsnail species distribution generally conformed to a stochastic model. A noteworthy exception was one low streamside sample in which ecological factors were likely operative, but taphonomic forces may have introduced a certain bias.

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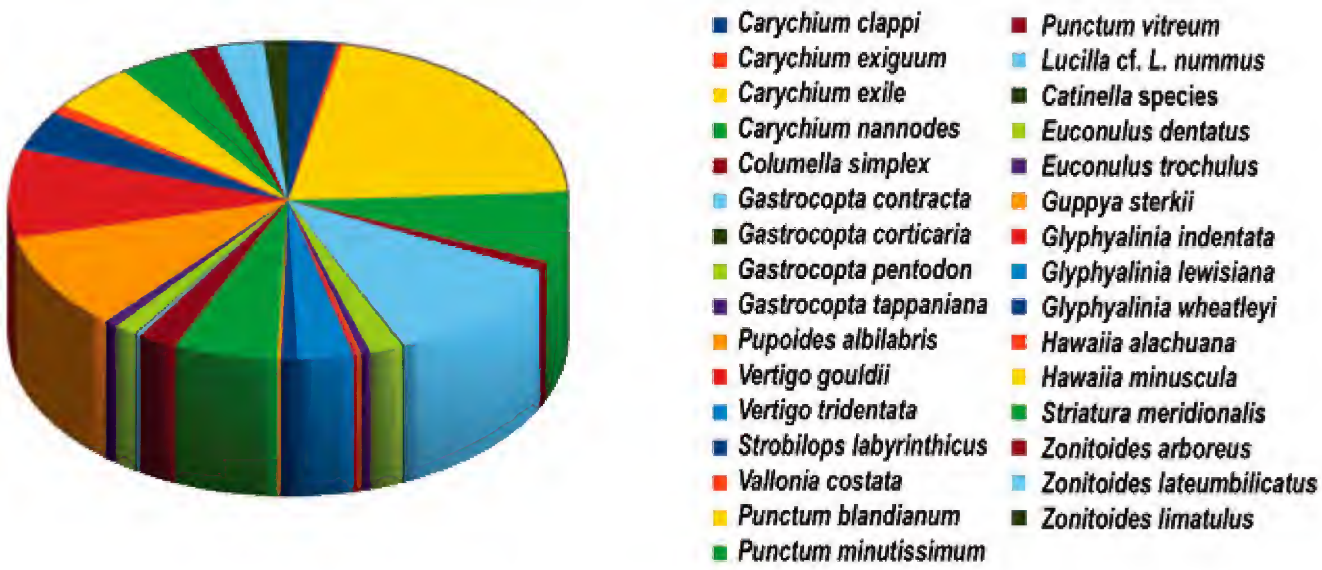
Table1. The 31 microsnail taxa and individuals (951) collected.

Carychium clappi Hubricht, 1959, Appalachian Thorn (27)
Carychium exiguum (Say, 1822), Obese Thorn (3)
Carychium exile H.C. Lea, 1842, Ice Thorn (199)
Carychium nannodes G. Clapp, 1905, File Thorn (68)
Columella simplex (Gould, 1840), Toothless Column (10)
Gastrocopta contracta (Say, 1822), Bottleneck Snaggletooth (104)
Gastrocopta corticaria (Say, 1817), Bark Snaggletooth (1)
Gastrocopta pentodon (Say, 1822), Comb Snaggletooth (18)
Gastrocopta tappaniana (C.B. Adams, 1841), White Snaggletooth (6)
Pupoides albilabris (C.B. Adams, 1842), White-lip Dagger (1)
Vertigo gouldii (A. Binney, 1843), Variable Vertigo (3)
Vertigo tridentata Wolf, 1870, Honey Vertigo (30)
Strobilops labyrinthicus (Say, 1817), Maze Pinecone (9)
Vallonia costata (Müller, 1774), Costate Vallonia (1)
Punctum blandianum Pilsbry, 1900, Brown Spot (1)
Punctum minutissimum (I. Lea, 1841), Small Spot (57)
Punctum vitreum (H.B. Baker, 1930), Glass Spot (22)
Lucilla cf. *L. nummus* (Vanatta, 1899), cf. Wax Coil (2)
Catinella species unknown Ambersnail (1)
Euconulus dentatus (Sterki, 1893), Toothed Hive (12)
Euconulus trochulus (Reinhardt, 1883), Silk Hive (8)
Guppya sterkii (Dall, 1888), Tiny Granule (94)
Glyphyalinia indentata (Say, 1823), Carved Glyph (86)
Glyphyalinia lewisiana (G. Clapp, 1908), Pale Glyph (1)
Glyphyalinia wheatleyi (Bland, 1883), Bright Glyph (37)
Hawaiia alachuana (Dall, 1885), Southeastern Gem (9)
Hawaiia minuscula (A. Binney, 1841), Minute Gem (46)
Striatura meridionalis (Pilsbry and Ferriss, 1906), Southern Striate (40)
Zonitoides arboreus (Say, 1817), Quick Gloss (16)
Zonitoides lateumbilicatus (Pilsbry, 1895), Striate Gloss (26)
Zonitoides limatulus (A. Binney, 1840), Dull Gloss (13)

Table 2. Microsnail taxa and specimens collected by sample site.

	1. Limestone escarpment	2. Tree crotch	3. Soil sample	4. Leaf litter	5. Under deadfall	6. Creek & wrack
Carychium clappi	2	25				
Carychium exiguum				2		1
Carychium exile	157	1	16	12	2	11
Carychium nannodes	6	4	39	16	3	
Columella simplex	1		1	2	4	2
Gastrocopta contracta	37	13	15	31	2	6
Gastrocopta corticaria	1					
Gastrocopta pentodon	6	2	4	3	1	2
Gastrocopta tappaniana	1					5
Pupoides albilabris						1
Vertigo gouldii		2		1		
Vertigo tridentata	3		5	20		2
Strobilops labyrinthicus	3	1	1	4		
Vallonia costata						1
Punctum blandianum				1		
Punctum minutissimum	22	6	12	14	2	1
Punctum vitreum	1	1	9	10	1	
Lucilla cf. *L. nummus*						2
Catinella species						1
Euconulus dentatus	2		1	7		2
Euconulus trochulus		1	2	4	1	
Guppya sterkii	45	20	21	4	4	
Glyphyalinia indentata	35	13	19	8	4	7
Glyphyalinia lewisiana				1		
Glyphyalinia wheatleyi	7	7	8	13	2	
Hawaiia alachuana	7	1	1			
Hawaiia minuscula	31	8	5	2		
Striatura meridionalis	15	10	8	1	2	4
Zonitoides arboreus		2	3	8	1	2
Zonitoides lateumbilicatus	4	9	9	4		
Zonitoides limatulus	8		1		4	
Total specimens collected	**394**	**126**	**180**	**168**	**33**	**50**
Total species found	**21**	**18**	**20**	**22**	**14**	**16**
Species unique to substation	**1**	**0**	**0**	**2**	**0**	**4**

Figure 1. Overall microsnail abundance (all six samples); n = 951



Slices begin at noon and progress clockwise in customary phylogentic order as per legend.

Figure 2. Microsnail abundance by sample; n = 951.

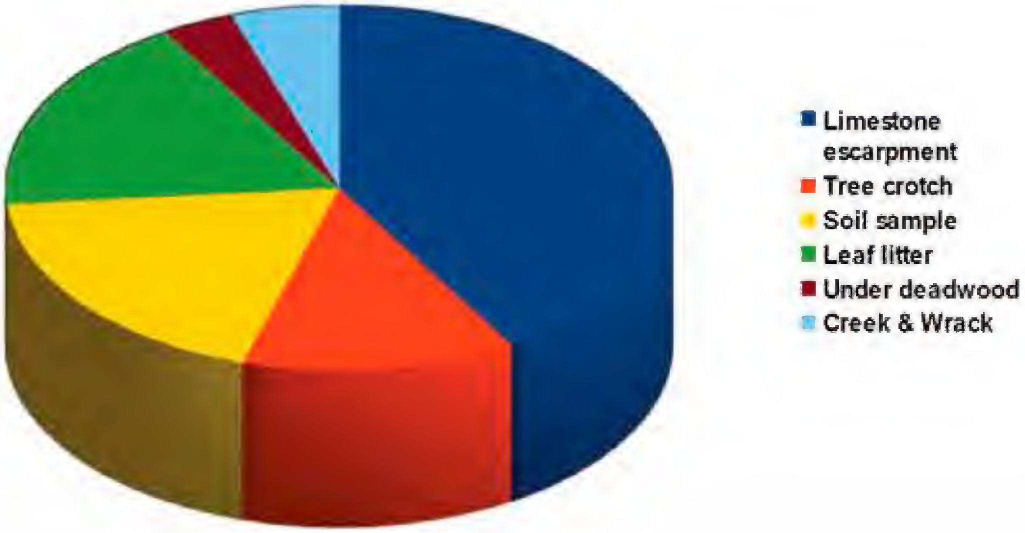


Figure 3. Microsnail species abundance showing contribution by sample.

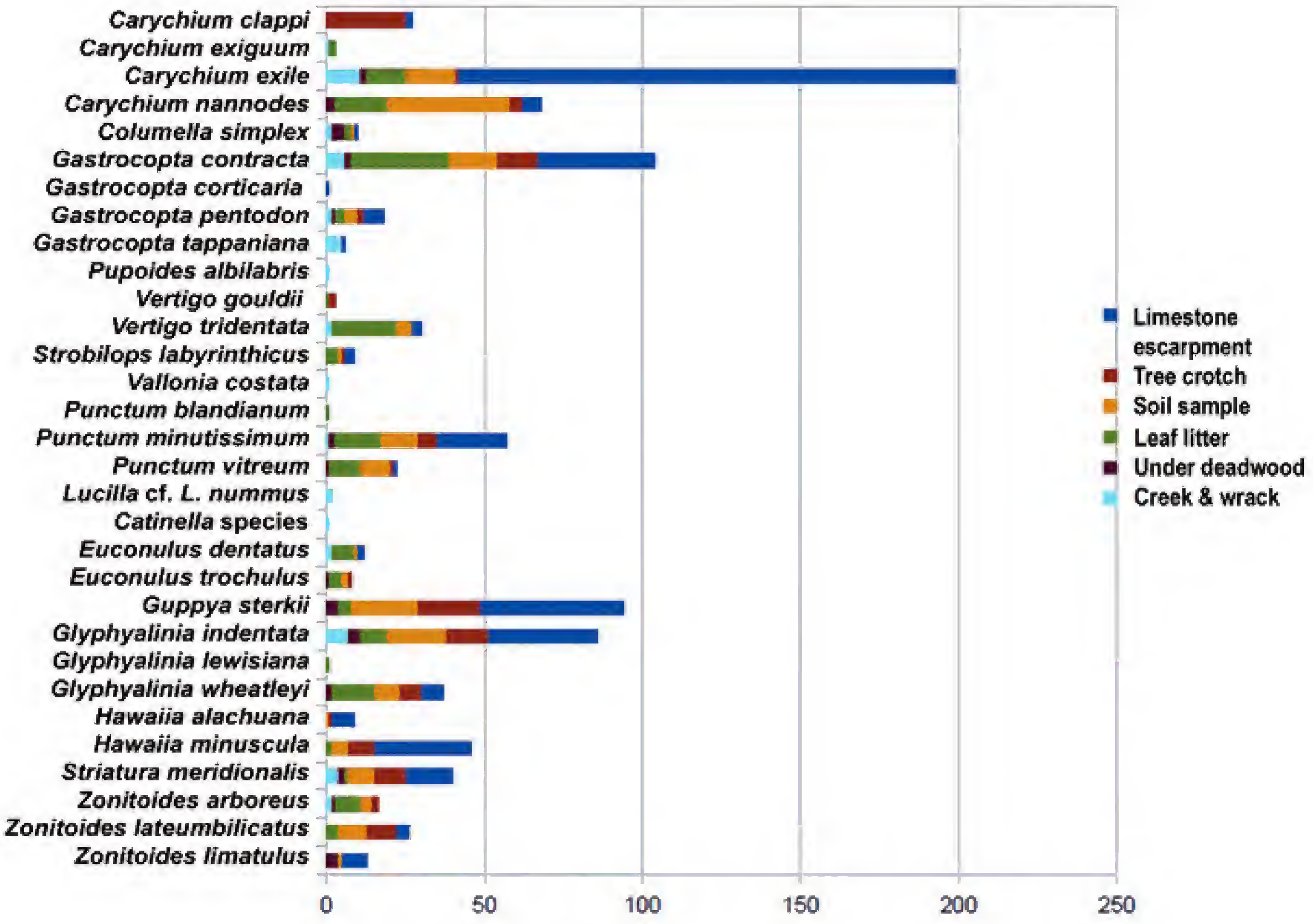


Figure 4. Absolute microsnail abundance by species for each sample.

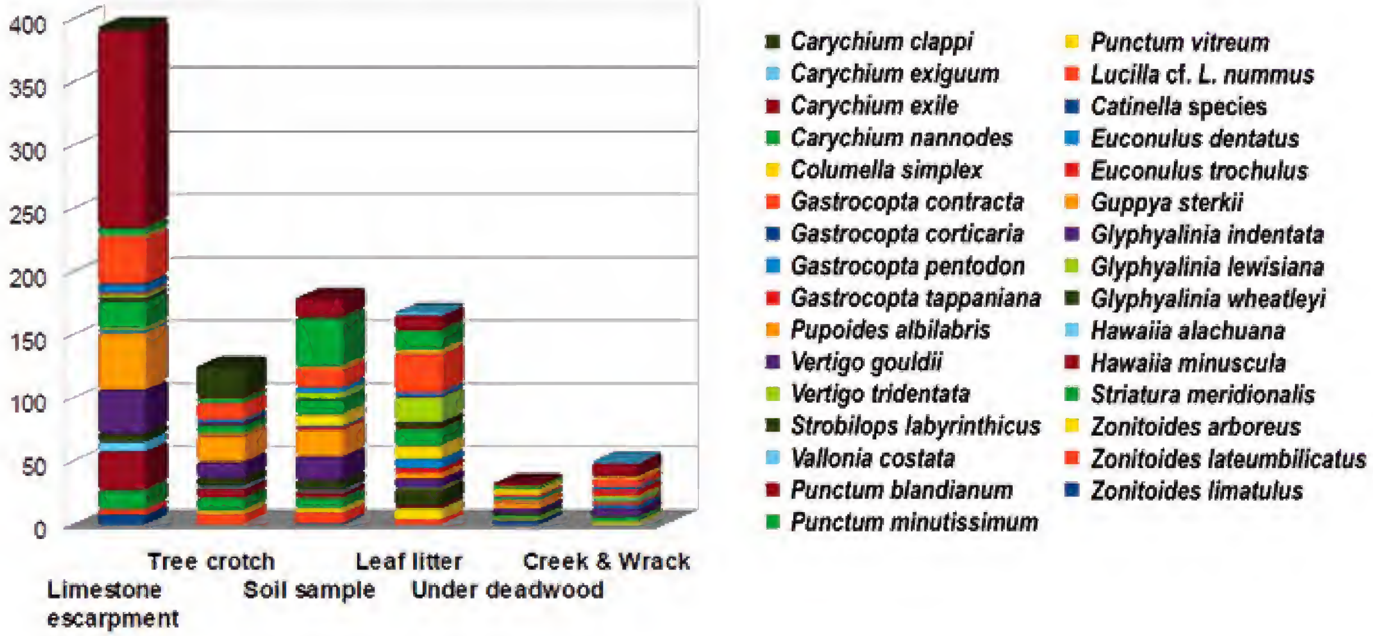
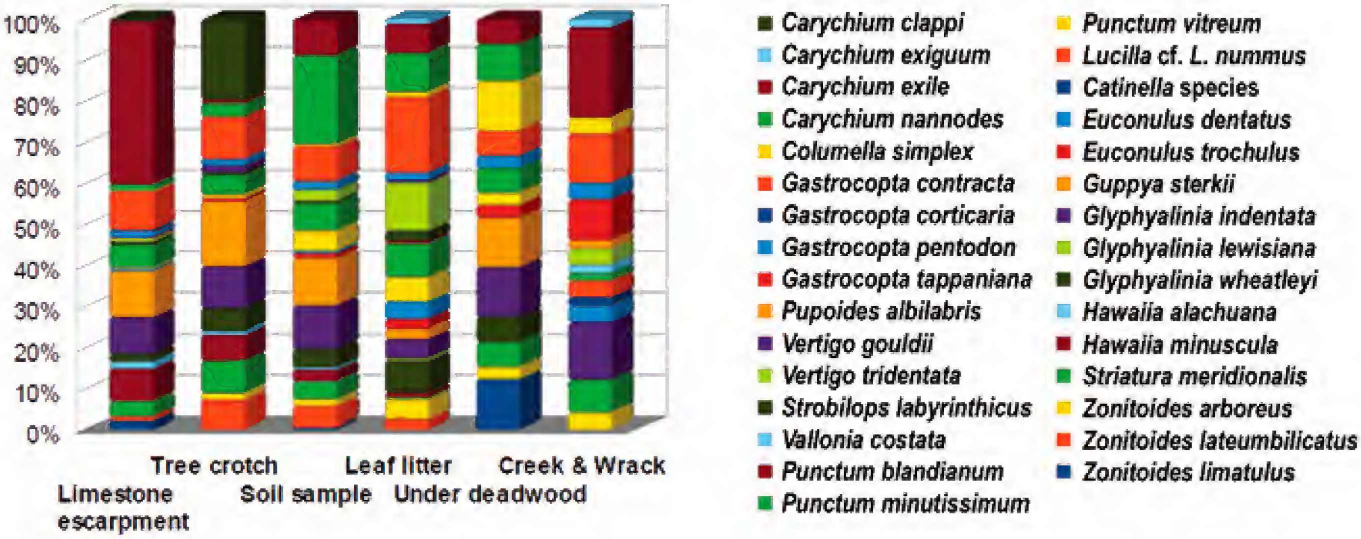
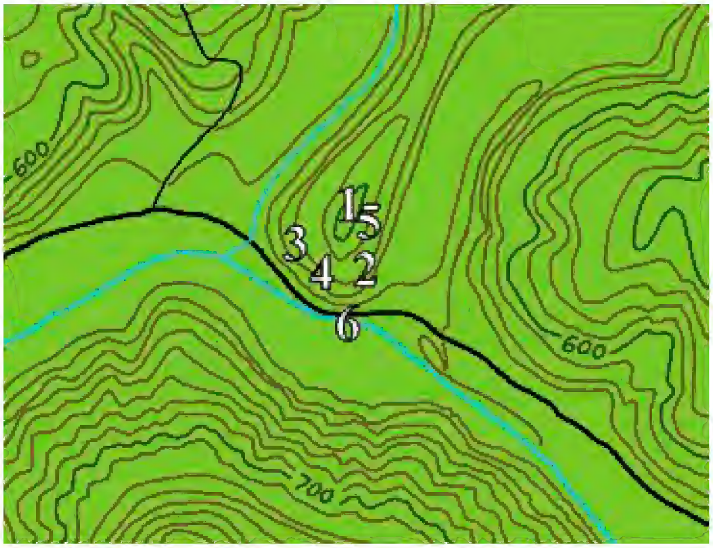


Figure 5. Relative microsnail abundance by species for each sample (as percentage).



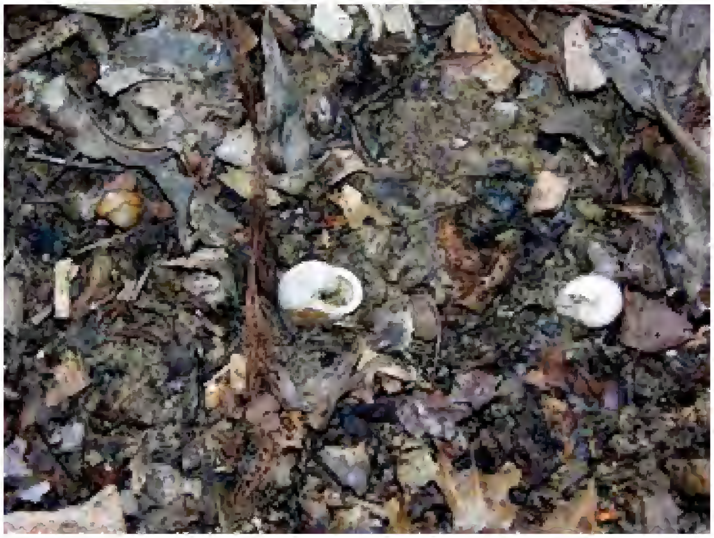
Appendix

Images 1, 1a (above & bottom right) Limestone escarpment at summit of "Kochi Hill." Elevation about 30 m above road grade (sample site no. 1).



Map 1. Location of sampling sites at "Kochi Hill."

Images 2, 2a (left & above) Tree crotch site, situated within a larger fallen tree (site no. 2).



Images 3, 3a (left & above) Foot of "Kochi Hill." Here both soil and leaf litter samples (sites nos. 3 and 4) taken in close proximity.

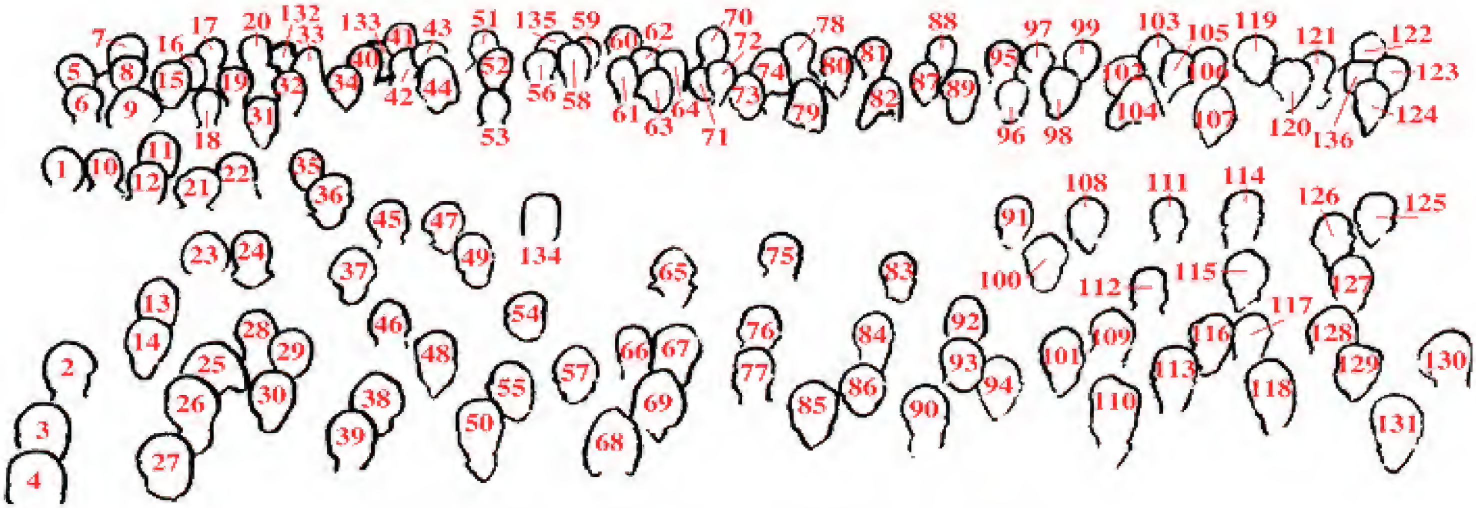
Images 4, 4a (left & above) Wilson Creek at site no. 6. The photo above shows the close proximity of "Kochi Hill" (background, right). On the left is a view looking in the opposite direction.

Images 5, 5a (above & right) Deadwood just below limestone escarpment near summit of "Kochi Hill." A fresh *Mesomphix* species shell was uncovered when bark was lifted to obtain the sample (site no. 5).

Table 3. Cumulative list (53 species) collected at "Kochi Hill," BARF from 7 June, 2009 to 25 November, 2011*

Pomatiopsis cincinnatiensis (I. Lea, 1840), Brown Walker
Pomatiopsis lapidaria (Say, 1817), Slender Walker
***Carychium clappi* Hubricht, 1959, Appalachian Thorn**
***Carychium exiguum* (Say, 1822), Obese Thorn**
***Carychium exile* H.C. Lea, 1842, Ice Thorn**
***Carychium nannodes* G. Clapp, 1905, File Thorn**
***Columella simplex* (Gould, 1840), Toothless Column**
***Gastrocopta contracta* (Say, 1822), Bottleneck Snaggletooth**
***Gastrocopta corticaria* (Say, 1817), Bark Snaggletooth**
***Gastrocopta pentodon* (Say, 1822), Comb Snaggletooth**
***Gastrocopta tappaniana* (C.B. Adams, 1841), White Snaggletooth**
***Pupoides albilabris* (C.B. Adams, 1842), White-lip Dagger**
***Vertigo gouldii* (A. Binney, 1843), Variable Vertigo**
***Vertigo tridentata* Wolf, 1870, Honey Vertigo**
***Strobilops labyrinthicus* (Say, 1817), Maze Pinecone**
***Vallonia costata* (Müller, 1774), Costate Vallonia**
Haplotrema concavum (Say, 1821), Gray-foot Lancetooth
***Punctum blandianum* Pilsbry, 1900, Brown Spot**
***Punctum minutissimum* (I. Lea, 1841), Small Spot**
***Punctum vitreum* (H.B. Baker, 1930), Glass Spot**
***Catinella* species unknown Ambersnail**
***Lucilla* cf. *L. nummus* (Vanatta, 1899), cf. Wax Coil**
Anguispira alternata (Say, 1817), Flamed Tigersnail
Anguispira kochi (L. Pfeiffer, 1846), Banded Tigersnail
***Euconulus dentatus* (Sterki, 1893), Toothed Hive**
***Euconulus trochulus* (Reinhardt, 1883), Silk Hive**
***Guppya sterkii* (Dall, 1888), Tiny Granule**
***Glyphyalinia indentata* (Say, 1823), Carved Glyph**
***Glyphyalinia lewisiana* (G. Clapp, 1908), Pale Glyph**
***Glyphyalinia wheatleyi* (Bland, 1883), Bright Glyph**
***Hawaiia alachuana* (Dall, 1885), Southeastern Gem**
***Hawaiia minuscula* (A. Binney, 1841), Minute Gem**
Mesomphix cupreus (Rafinesque, 1831), Copper Button
Mesomphix globosus (MacMillan, 1940), Globose Button
Mesomphix vulgatus H. B. Baker, 1933, Common Button
Paravitrea cf. *P. capsella* (Gould, 1851), Dimple Supercoil
***Striatura meridionalis* (Pilsbry and Ferriss, 1906), Southern Striate**
Ventridens ligera (Say, 1821), Globose Dome
***Zonitoides arboreus* (Say, 1817), Quick Gloss**
***Zonitoides lateumbilicatus* (Pilsbry, 1895), Striate Gloss**
***Zonitoides limatulus* (A. Binney, 1841), Dull Gloss**
Allogona profunda (Say, 1821), Broad-banded Forestsnail
Euchemotrema fraternum (Say, 1824), Upland Pillsnail
Inflectarius inflectus (Say, 1821), Shagreen
Mesodon thyroidus (Say, 1817), White-lip Globe
Mesodon zaletus (A. Binney, 1837), Toothed Globe
Neohelix albolabris (Say, 1817), Whitelip
Stenotrema angellum Hubricht, 1958, Kentucky Slitmouth
Stenotrema barbatum (G. Clapp, 1904)/*S. hirsutum* (Say, 1817), Bristled/Hairy Slitmouth
[single immature shell denuded of periostracum; ID limited to two taxa]
Stenotrema stenotrema (L. Pfeiffer, 1842), Inland Slitmouth
Triodopsis vulgata Pilsbry, 1940, Dished Threetooth
Xolotrema denotatum (Férussac, 1821), Velvet Wedge
Xolotrema obstrictum (Say, 1821), Sharp Wedge

*Microsnails in black (32), **boldface this study (31)**; non-microsnails in red (21).



AMS/COA Group photo dramatis personae (long version)

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2. Paul Valentich-Scott, Santa Barbara Museum of Natural History
3.
4. Phil Fallon
5. Diarmaid O'Foighil, University of Michigan
6. Carol Lyons, St. Petersburg, FL
7. Eike Neubert
8. Rich Kirk, Philadelphia, PA
9. Sue Hobbs, Cape May, NJ
10. James H. McLean, Santa Barbara Museum of Natural History
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12. Hans Reiman
13. Jay Cordeiro
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35. Victor Dan, Manila, Philippines
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38. Elaine Friedman
39. Suzete Gomes, Academy of Natural Sciences, Philadelphia
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42. Frank Köhler
43. Tom Eichhorst, New Mexico
44. Serena Ciparis, Virginia Polytechnic Institute and State University
45. Happy Robertson, New Jersey
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49. Dick Petit, Myrtle Beach, SC
50. Fred Zimmerman, USDA, Miami
51. Russell Wyeth, St. Francis Xavier Univ. Canada
52. John Taylor, Natural History Museum, London, UK
53. Norine Yeung, University of Hawaii
54. Donald Dan, Fort Myers, FL
55. David Friedman
56. Gregory B. McCullagh, St. Francis Xavier Univ., Canada
57. Sheila Tagaro, Conchology Inc., Philippines
58. Jack Lightbourn, Bermuda
59.
60. Klaus Groh, Conchbooks, Germany
61. James B. Newcomb
62.
63. Desmond Ramirez
64. Roland Anderson
65. Robert Robertson, Academy of Natural Sciences, Philadelphia
66. Beth Davis-Berg
67. Asel Zhetigenova Busuioc, New York
68. Amanda Lawless, Academy of Natural Sciences, Philadelphia
69. Adrienne Jochum
70. Jeff Nekola, University of New Mexico
71. Mary-Jane Schilling
72. Anita Krause (?)
73. M. Sabrina Pankey
74. Jeanne Serb
75. Bob Lipe
76. Kyle Bennett
77. Timea Neusser
78. John Sime, Academy of Natural Sciences, Philadelphia
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80. Jeremy Tiemann
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82.
83. Betty Lipe
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85. Philippe Bouchet, Museum national d'Histoire Naturelle, Paris
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87. Paul Harnik
88. Kevin Roe
89. Phyllis Gray
90. Francisco Welter-Schultes
91. Al Schilling, Philadelphia Shell Club
92.
93. Charlie Sturm, Carnegie Museum of Natural History, Pittsburgh
94. Ed Shuller
95. Peter Marko
96. Amy Wethington
97. R. T. Dillon Jr.
98. Tom Duda
99. David Scheel
100. Doris Underwood
101. Tim Pearce, Carnegie Museum of Natural History, Pittsburgh
102. Tom Waller, Smithsonian Institution
103. Alistair Moncur
104. Holly Hale
105. M. G. Harasewych, Smithsonian Institution
106. Jim Brunner
107. Linda Brunner
108. Alan Gettleman
109. Scott Martin
110. Patrick LaFollette
111. Christine E. Parent
112.
113. John Slapcinsky, Florida Museum of Natural History
114. Ed Nieburger
115. Jesus Troncoso
116. Jeannette Tysor
117. Gary Rosenberg, Academy of Natural Sciences, Philadelphia
118. Henry Chaney
119. Doug Wolfe
120. Nancy Wolfe
121. Fabio Moretzsohn
122. Lyle Campbell
123. Terry Gosliner
124. Francisco Borrero
125. Adam Baldinger, Museum of Comparative Zoology, Harvard University
126. Paul Callomon, Academy of Natural Sciences, Philadelphia
127. Rodger Bunnell, Sanibel, FL
128. Erin Mayer, University of California, Berkeley
129. Ira Richling, Stuttgart
130. Carole Hickman
131. Manuel A. E. Malaquias, Bergen, Norway
132. Bill Lyons
133. Bruce Neville, College Station, Texas
134. Anne Joffe, Sanibel, FL
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